THE

DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY
JAMES W. WHITE, M.D., D.D.S.

Observe, Compare, Reflect, Record.

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THE

DENTAL COSMOS.

VOL. XXVII. PHILADELPHIA, JANUARY, 1885. No. 1.

ORIGINAL COMMUNICATIONS.

THE FIRST DENTITION.

BY J. W. WHITE, M.D.

THAT acute observer and distinguished physiognomist and controversialist, Lavater, has left many epigrammatic remarks worthy of attention, but none more deserving of remembrance than the following—the failure to observe the principle involved being very conspicuous in these days of experiment and discussion:

"He only sees well who sees the whole in the parts and the parts in the whole. I know but three classes of men: those who see the whole, those who see but a part, and those who see both together."

This concise presentation is in substance thus commented on by one who has accustomed himself to measure men by the Lavater standard: "Of these three classes, the party of the second part is doubtless in the majority; the party of the first part next in numerical preponderance, and the party of the third part—those who can take in the general in their mental scope, and still distinguish and duly weigh the parts—are in a feeble minority. If they were not too small a party to form a constant power in politics, theology, or science, floods of words and oceans of ink would be saved. Class number three is the best one in which to enroll one's self for all purposes of investigation."

Much of the divergence of opinion with reference to medical and dental practice is explainable only on the assumption that the extremists on either side belong to the party of the second part.

A report of a discussion which recently took place before a medical association represents one of the speakers as saying that dentition had no more influence in the causation of pathological conditions than have the growth of the hair and the nails,—basing his assertion on the fact that they were alike physiological processes. On the other hand, lancing of the gums was deemed good routine practice whenever there occurred a departure from a normal con-

dition during the teething period. Thus, the derangements of health which are so frequent and so serious during the period occupied in the eruption of the deciduous teeth are viewed by these extremists either as having no relation whatever to dental evolution, or as almost invariably dependent upon this process. As is generally the case, the truth is probably midway between these two extremes.

Dentition is without controversy a physiological process, and under conditions in every respect favorable may proceed with little or no disturbance to the child. So, also, are the beginning and cessation of menstruation physiological processes. Such, also, is uterogestation. These, however, are subject to perversions and deflections, which not infrequently place them within the domain of pathology, and it seems not unreasonable to assume that dentition is frequently concerned in the production or aggravation of infantile derangements. Those, therefore, who assume that in every case of dentition mechanical help is desirable and useful, if not absolutely necessary, are, it would seem, as much in error as are those who teach that such help is never required.

When dental evolution proceeds without apparent disturbance, interference would be manifestly unwise and improper. But there are other cases in which the indications point so plainly to dental complications as the disturbing element that only preconceived opinions could prevent their recognition.

The peculiar impressibility of infancy, and the direct and sympathetic relations of the teeth to the whole organism, should be considered in forming a judgment as to the probability of disturbances of equilibrium resulting from any want of accord between the propulsive and resistive forces concerned in the liberation of the dental organs from their osseous and fibrous coverings. So, also, should the special tendency in infancy to reflex phenomena—explainable by the predominance of the spinal system—be accorded the importance to which it is entitled.

Nor should the fact be overlooked or disregarded that the body of an infant is characterized by peculiarities of structure and function differing from the adult. These differences explain the tendency of disease in children to assume a sthenic type, and also explain the facility with which morbid action is transferred by extension, metastasis, or reflection to organs not originally implicated; the activity of the vascular system, the free supply of blood to the tissues, and the susceptibility of the nervous system contributing to the creation of a special liability to intense and dangerous reactions from local irritation. Various causes may produce such an irritation of the spinal centers that the coördinating function of the brain may be

overpowered, and irregular muscular actions, spasms, or convulsions ensue. Of these causes, none are more liable to act as excitants of convulsions than irritation of the fifth and pneumogastric nerves. Oftener than from any other causes, spasm is the indication of irritation in the field of distribution of the fifth nerve, or of gastric or intestinal trouble.

The profound disturbance which may be excited in a young child by slight causes is a matter of common observation. A mere interference with function may result in consequences out of all seeming proportion to the gravity of the cause. The presence in the alimentary tract of a little indigestible food; worms; a misplaced pin; continued pressure, as by a string or bandage; any considerable irritation of the cutaneous surface, will excite a more or less severe fever in proportion to the predisposing conditions present. If in the adult the irritation of a dental nerve may give rise to neuralgia, hysteria, chorea, tetanus, etc., it is not only possible but highly probable that a like irritation may be the occasion of grave and fatal disorders in the infant.

APPARATUS FOR ROTATING TEETH.

BY J. N. FARRAR, M.D., D.D.S.

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No. XXIV.

Double Concentric-Loop Rotators.

The devices which I denominate double concentric-loop rotators, although a little difficult to construct and somewhat clumsy to wear, are extremely practical in the hands of the skillful. Fig. 141 illustrates the principle of these rotators as one of them would appear when placed upon teeth, situated as shown by dotted lines. B″ in Fig. 142 shows the same device as it would appear reversed, and in detached parts by B′. As will be seen, this is but another modification of the device illustrated by Fig. 135, differing by the use of a second band outside of a clamp-band, B, which may be denominated the draught-band.

These clamp-bands, constructed to be tightened upon the tooth, may be variously made. This modification makes use of a short bolt, C. To this clamp-band, in the vicinity of the nut, N″, is attached, by solder, one end of the draught-band, O. To the other end is soldered a threaded nut, P, through which passes a long screw, S, having its other extremity pivoted so as to set in a hole in the nut, P′, which is soldered to or otherwise connected with the clamp-band, B, by means of a thin metallic ribbon or a wire loop, L, caught over the end of the bolt, C, in such a manner that when the

two nuts, P, P′, are forced apart by the screw, S, a double draught acts upon the tooth, in a direction that will tend to rotate it as indicated by the curved arrow.

Instead of connecting the draught-band, O, to the clamp-band, B, with a loop, L, to catch over the ends of the bolt, C (Fig. 142), it may

Fig. 141.

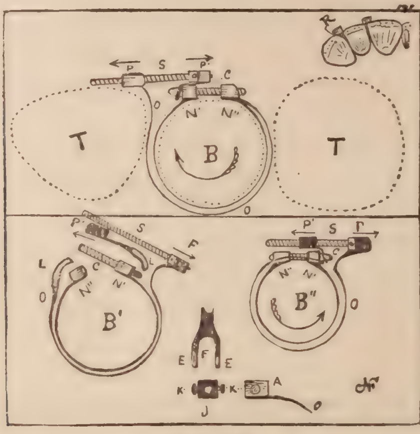


Fig. 142.

be made fork-like (E, E), so as to catch over knobs or hooks (K, K), soldered to the sides of the nut, P, as shown by J, A, Fig. 142.

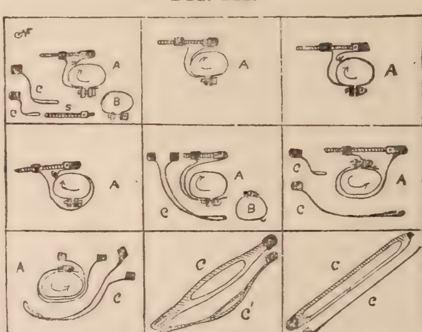
This unique apparatus, however, is capable of several modifications without materially changing the principle of philosophy. The

Fig. 144.

Fig. 143. Fig. 145.

Fig. 146. Fig. 148.

Fig. 149. Fig. 151.



150.

above group of nine figures, illustrating several variations made by the author, is here presented for the benefit of those interested. As will be seen, the principal differences lie in the length, form, and places of attachment of the draught-band.

Various Modifications of Rotators.

Fig. 143 illustrates a modification made in three detachable parts, C, C, B, as shown. The screw, S, of the clamp-band, B, however, is on the opposite side of the tooth over which the looped end of the draught-band is caught, as shown by A. The other draught-nut is represented as being caught over a hook soldered to the opposite side of the clamp-band, B. The advantage of detachable parts lies in the easy repair of any one that may become broken, but the fixture is more difficult to apply than if soldered together.

Fig. 144 illustrates a similarly constructed rotator, having all its parts soldered together, which, though easy to adjust, is useless if broken, unless mended.

Fig. 145 shows how the draught-band may be soldered to the clamp-band, while the other draught-nut loop may be caught by a hook into a staple.

Fig. 146 illustrates the same, except that the draught-band is long enough to nearly encircle the tooth, and is also soldered to the clamp-band, B. Care should be exercised in soldering this draught-band, so that it will lie to one side of the clamp-band nuts and screw.

Fig. 147 (central figure) illustrates an excellent modification, because effectual, and, being composed of only two parts, C, B, is simple. The draught-band, C, though in two parts, is united at the loop end, so as to be easily caught over the end of the screw or hook, as the case may be.

Fig. 148 differently illustrates a modification similar to that illustrated by Figure 142, and is composed of three parts.

Fig. 149 illustrates the parts separately and unitedly of a modification similar to that represented by the central figure, 147, differing only in the length of the draught-band, C.

Fig. 150 illustrates two views of a peculiar but valuable form of longer draught-band. While all others thus far described consist of a straight, ribbon-like strip (of rolled wire), this is open in its middle, in order to permit it to rest firmly on the tooth on both sides of the clamp-band, bolt, and nuts.

Fig. 151 illustrates also two views of a similar though more valuable form of double long-draught band, but differing only in the extent of the slot. These two forms of bands, Figures 150 and 151, are only necessary for rotators requiring a long band, such as are shown by Figures 146 and 148.

Application.—When teeth are so overcrowded that this device cannot be easily adjusted, they may be spread apart by wedges, but easier by a triplex-acting screw-loop (Figure 135). After the rotator is adjusted, the patient should be instructed to turn the screw, S, with a key or lever as much as possible without causing pain, two

or three times a day, when the apparatus will not only keep the two adjacent teeth apart, but will rotate the middle one at the same time.

The most objectionable part of these rotators thus far illustrated is the means of tightening the clamp-band, B. The two nuts, N′, N″, and the screw, C, are sometimes a serious obstacle. In order to avoid this, other means may be adopted for anchoring the draught-band to the tooth, among which the narrow ferrule, fitted around the tooth and set in phosphate of zinc, or tightened with wooden wedges or by a gum-guard ring (Fig. 100, page 348, vol. xxiii., Dental Cosmos, 1881), fitted closely and driven on to the tooth, are among the best plans. But when there is a suitable cavity in the tooth to be rotated, a small hook or staple may sometimes be temporarily set in it with phosphate of zinc or amalgam, on which the

Fig. 152. Fig. 153.

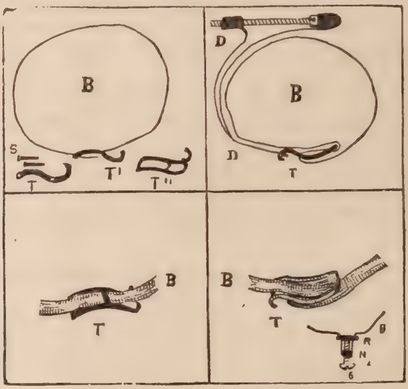


Fig. 154. Figs. 155, 156.

draught-band may be caught, thus avoiding the clamp-band, B, entirely.

There is, however, a buckle method of tightening the tooth clamp-band, which is nearly free from these objections, and which in skillful hands will be found practicable, but its success depends entirely upon nicety of adjustment. Figs. 152, 153, 154, 155 illustrate the principle of such a device, shown in the different positions on an exaggerated plan, in order to be easily understood; but in practice the two pin bars, S, Fig. 152, should be nearer together, and the buckle frame shorter. Fig. 156 shows a still different method for the same purpose. These, which are of some of my later thoughts, nearly solve a long recognized difficulty.

Retainers.—When single teeth, situated as shown by Fig. 138, are brought into position, they may be easily retained temporarily by

the use of one of these clamp-bands, B, minus the screw, if carefully pressed up around the tooth, so that the nuts will rest over the adjacent teeth as shown by R in Fig. 141. But a little strip of gold plate, properly fitted in the same way, is better in appearance.

When there are cavities conveniently located, little wires may be set in them, so that, if properly bent about the teeth, they will serve the same purpose. But whatever form of retainer is used, it should be kept scrupulously clean.

Suggestion.—In conclusion, let me say that the success of these devices depends upon the proper delicacy of their construction and fitness in application. No bunglingly made article will work satisfactorily, if at all. This suggestion is made and urged because some persons, who have tried to make and use devices explained by me have failed for this reason, and seemingly without being conscious where the fault lay, have endeavored by criticism, publicly expressed, to persuade others that it was impossible to do things which, in fact, with the more skillful, are done with ease; and in their unfortunate bitterness they have even gone so far as to broadly hint that devices advocated (which have for years been in use with great success) have never existed except on paper.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a regular monthly meeting October 21, 1884, at the house of Dr. O. E. Hill, No. 160 Clinton street, Brooklyn.

The president, Dr. William Jarvie, in the chair.

Dr. S. G. Perry. I have thought for a long time that a great many of our most skillful operators have many times fallen somewhat short of a high standard of excellence in their approximal surface operations, because of inability, under all circumstances, to make perfect restorations of contour. It is not always possible to have the teeth wedged apart sufficiently to get such access to the cavities as we would like, because sometimes the patient cannot wait long enough, or cannot come to us to have the wedges placed or changed. Under such circumstances we have to do the best we can, and it is easy to understand how skillful men will sometimes fail to accomplish just what they would like to do. I appreciated this fact years ago, and I worked out a little device for separating teeth which could be applied and left on while the operation of filling was performed. In 1876 or 1877 I exhibited this device, in a

rather crude form, at Albany, and I used them for several years in that imperfect state. Since then I have varied the form somewhat, and have experimented with different shapes until I have settled down upon the form of separation which I now exhibit as being the best I have been able to make. By applying them to the teeth to be separated and gently turning the screw, little by little, as the patient can bear it, space enough can be secured between the approximal surfaces of almost any teeth to enable the operator to make full contour fillings, and finish them with ordinary emery-cloth strips; so that, when the separator has been removed, the teeth will come back to their natural position, leaving no space for the lodgment of food. There is another clear gain during the operation itself, and that is that, after the separator is applied and the screw tightened for the purpose of obtaining space, the teeth are so firmly held that there is some little obtunding of sensibility in operating upon them, especially with the mallet; the teeth are so steadied that there is no doubt the whole operation is more endurable than it would be if they had no such support. That is a sufficient advantage, if there were no other, to encourage the use of the separator.

It is a difficult thing to so shape a single separator that it shall be universal and adapted to all teeth, because teeth vary so much; but I have found, after making many experiments, that a set of four different sizes will meet all ordinary requirements and apply easily to most of the teeth we need to separate. If the attempt is made to make a universal one, instead of a set of three or four adapted to the different teeth, there is a certain gain in adaptability, but there is a loss of steadiness and power; for if the separator is made large enough for teeth of any size, the circle is so large, the screw must be placed so far back that there is a great loss of power when it is applied to the smaller teeth, and there is more or less danger of the jaw slipping up or down, against, or away from the gum. They will hold until the screw is tightened, and then suddenly turn, causing the patient considerable pain. That objection is overcome by having different sizes adapted to the different teeth to be operated upon. I have therefore held to the first form that I worked out, simply adapting the separator to the particular teeth they are intended to move. First, I have a set for separating molars which are made large enough to cover the largest teeth we are liable to meet, yet the jaws are so small that they will not slip off the smallest molar, and they will therefore cover every case. These separators will give you access to cavities on both approximal surfaces, and they will generally gain space enough without previous wedging to enable you to properly finish the fillings. They

are reversible, the screw being changed in a moment, making it possible to adjust them to the outside or the inside; and, as molars are so uniform in shape, they are applicable to either side of the mouth. The dipping down of the shank of the instrument has a purpose. One reason is to get it out of the way, and another is that the screw shall stand directly in line with the two bearings. If the screw is placed above that line there is a teetering tendency. By dipping the shank down in this way the screw is brought into a direct line with the two points of bearing, and thereby the tendency to teeter is nearly done away with. The pair designed for the molars is nearly as applicable to the lower as to the upper teeth, and will adapt itself to the inside as well as to the outside of the mouth. The reason for making the shank short is that it may be placed very far back in the mouth without having the cheek interfere with it when placed outside, or the tongue when it is adjusted inside. The next one I have devised is arranged for the first molar and the bicuspid, one jaw of the instrument being large and the other smaller. It is applicable to the teeth on either side, and is almost a universal clamp for bicuspids and molars. Then, for bicuspids, I have a single one, so arranged as to fit the largest or the smallest, and intended to be used with the shank of the instrument on the outside or the inside, as may seem best. This is readily applicable to the bicuspids of the upper jaw, but not so readily to those of the lower jaw, because they are smaller teeth,—particularly the first bicuspid.

For front teeth, here is a sort of universal separator, made on the same general plan, and with the same care given to the matter of getting the points of bearing in line with the screw, but having a larger bow, so that it is adapted to any of the front teeth, no matter how long they may be. The points of the jaws are brought near together, so that the opening shall be short enough to permit clasping the lower incisors, and yet far enough apart to be slipped over the upper incisors. They will slip over any of the incisors, as a central and a lateral, a lateral and a cuspid, and almost invariably the first bicuspid and cuspid also. In the last-named case it is, perhaps, a little more difficult than in the others. The separators cannot always be applied to mal-positioned or irregular teeth with any degree of certainty. This one, with the jaws coming close together for use on the incisors, having a larger circle, can be applied also to the lower bicuspids, because where the first bicuspid is small the points of the jaws are so near together that they will not slip off, so that, if the one designed for the upper bicuspids fails, success may be obtained with this.

After a good deal of experimenting, and six or seven years' daily

use of these separators, I think I may safely say that with some one of that set of four instruments I can separate almost any of the teeth, somewhat at least, and without previous wedging. I do not undertake to separate them, however, in *every* case at once with these instruments. I think it is very well to put in a piece of tape, and allow it to remain for a day or two, by which means you get a little space, and then with one of these instruments you easily get the space necessary for your operation. In all cavities that come down to the grinding surface the amount of space gained by the use of this instrument gives you room enough for a thin-bladed trimming instrument and corundum-tape or emery-tape to pass through,—and that is about all you need. The S. S. White Dental Manufacturing Co. has the patterns of these separators, and will, I believe, soon be prepared to make them. A few pairs were made by Johnston Bros. some years ago, but without submitting them to me, and as I had no opportunity of seeing or criticising them before they were put out, they were very improperly made; there was no attempt at accuracy in their manufacture, and, because they were used at that time by some gentlemen without much success, the manufacture of them was discontinued. These I have here were made under my own supervision, and they have always been very useful. The bow is made stronger, so that the tendency to tip aside is obviated. The feeling on the part of the patient is at first one of dislike usually, but after the separator is on three or four minutes that feeling subsides, and is followed by one of decided comfort. The instrument gives a feeling of firmness to the teeth, and the pain attending the operation of filling is considerably lessened. The firmness of the teeth makes the blows of the electric or of the Bonwill mechanical mallet more endurable. Of course, when the separator is adjusted it makes a perfect rubber-dam clamp.

Dr. A. H. Brockway. I am very glad to see these instruments brought before us. I have for several years used the form of separator devised by Dr. Perry, and spoken of by him; and, notwithstanding its faulty construction in the weakness of the bow, I have got a great deal of satisfaction from it. I am glad that the idea of making a universal separator has been abandoned in favor of a set of four. The objection to a universal instrument of that kind lies in the fact that many of the advantages of the separator are sacrificed to the universality of its application. I find that fault in the one which I have.

You may remember, Mr. President, that at the time Dr. Fillebrown read his paper on the subject of cohesive gold I spoke of the advantage of wooden handles for plugging instruments, excavators, and scalers. I have had some in use for several years, and this sum-

mer I had a few more made. I have brought some of the pluggers here for the purpose of showing them to any gentleman who may desire to look at them. I am satisfied that no one can use instruments with wooden handles without being convinced of their great advantage over the ordinary metal handles. There is a softness and lightness about them that is very agreeable. You can also have sufficient bulk in the handle to be easily grasped, without the instrument possessing an inconvenient and disagreeable weight; and one will find that he can use them without feeling the degree of fatigue that steel-handled instruments produce. Wooden-handled pluggers have sometimes been objected to, on the ground that they did not admit of malleting. That is an entirely erroneous idea. I use them indifferently in mallet-work and hand-pressure, and find them thoroughly satisfactory in both cases.

Dr. Perry. With reference to these wood handles, there is no question in my mind but that they are superior to any steel-handled instrument for malleting. As the inertia of the instrument used must be overcome by the force applied, of course the heavier the instrument is the more the resistance, and the lighter the instrument the gentler the blow required. I am convinced that, if the electric mallet were furnished with wooden instruments, having delicate steel points, so that the force to be overcome would be at its minimum, the sensation produced by the blow would be reduced to its lowest terms. I think that if you would try wood-handled instruments for malleting you would be convinced, as I am, that they are the best instruments for mallet use that we have, to say nothing of their delightful feeling in the hand.

Dr. John B. Rich. As I left my office this evening it occurred to me that a little device that has been of very great service to me might be of use to others, and I brought it with me. It is for blowing chips out of a cavity. That is generally done with an instrument composed of a simple bulb, with a tube at one end and a valve at the other. In this form, the valve will not always work when the bulb is held in a horizontal position; but, by removing the valve and attaching a piece of rubber tubing about a foot long to the end where the valve was, and then attaching the valve to the end of the tube, which will always hang perpendicularly, the valve will fall into its seat and always stop when the bulb is compressed. This addition and change can be made by anyone in a few minutes. I have found the device a great convenience.

Dr. N. W. Kingsley. What is the objection to plugging up the back end entirely, and not having any valve there at all?

Dr. Rich. It depends upon how rapidly you want to fill it.

Dr. Kingsley. I can fill it fast enough without any valve.

Dr. Rich. You cannot fill it as fast as you can when there is a large valve at the ingress end to let the bulb fill quickly.

Dr. Kingsley. With all due deference to Dr. Rich, I do not see any use in having the little valve on the end of it.

Dr. Rich. I do not think I would like to follow the plan of Dr. Kingsley, if I wanted a very small blowing orifice.

Dr. Kingsley. I have made a dozen of those things in my laboratory with my own hands. I bought one or two of those bulbs that I suppose are made for syringes, and after that I used a toy rubber ball, of the smallest size, for a bellows, and I found that with that, and without a valve, I obtained all the results I could get with that kind of an arrangement with a valve. I made the blow-hole just the size that I found most useful.

Dr. W. H. Dwinelle. Perhaps most of you will recollect that some time last winter I gave a little exposition before our society of some experiments I was then making with morphine combined with atropine, for the purpose of quieting very nervous patients when they were having long and unpleasant operations performed. I use the morphine for its anodyne qualities, and the atropine for the purpose of overcoming the objectionable qualities of the morphine, and for the further purpose of checking the flow of saliva. We all know that one of the specific effects of atropine is that it dries up the secretions of the glandular system, and seems to suspend its action to a large degree. Persons who are afflicted with an exhausting flow of perspiration during illness are given atropine, which has a tendency to arrest that flow to an astonishing degree. On the occasion to which I refer I said that with patients of this nervous character or quality it was almost impossible to operate upon them at all in their normal condition. And I think I used for illustration the figure that it was like shooting a bird on the wing to hit the cavity at all,—one had to calculate the chances. I gave some illustrations of operations performed after administering this anodyne, wherein the very worst patients of this nervous character were brought entirely under control, and I had no difficulty whatever in performing long, tedious, and ordinarily painful operations. I have been experimenting since that time, and have been in correspondence with a large number of the members of our profession throughout the United States, and have had the benefit of their experience and their further experiments in this direction, and the reports that have come to me have invariably been favorable and most gratifying. I had a letter yesterday from a dentist in Nashville, who told me he had, seeing what I had said and published in the Dental Cosmos, commenced to use this compound. It had been of the greatest advantage to him in his practice, and he would not

be without it for any consideration. He had gone so far as to give it to the same patient six days in succession, without any inconvenience or bad effects whatever. Within a week past I have had one of those superlatively sensitive patients in the chair every other day for five or six hours at a time, and performed difficult and painful operations with impunity, and without any unpleasant effects whatever. There have been no ill effects in any instance. I generally recommend the patient to take some saline waters the following morning. The compound seems to be a substitute for food, as tobacco oftentimes is; persons taking it have no disposition to eat or drink during the day, and on arriving at home, instead of eating meats and other solid food, they have an appetite for fruit and vegetable diet,—fruit especially. I have proceeded in my experiments with great care, prudence, and delicacy, and I am satisfied that this article will be a boon to our profession. I want all of you to test it for yourselves, and any hints or assistance I can give you in the matter I shall extend to you with pleasure and satisfaction. My method of introducing it into the system is this: An hour previous to the proposed operation I give one-sixtieth of a grain of atropine, which can be obtained of McKesson & Robbins, or any other drug manufacturer. It is manufactured in a variety of forms. I give it to my patients in various quantities, according to their peculiarities or idiosyncracies; for we know that some persons can take with impunity sufficient opium to kill a number of persons with no injury to themselves. I start with one-sixtieth of a grain of atropine, combined with one-eighth of a grain of morphine; and an hour afterwards I repeat the dose. When I have ascertained the particular idiosyncracy of the patient, I often increase the dose of morphine. With the lady I had in my chair yesterday I started with one-sixtieth of a grain of atropine and one-fourth of a grain of morphine, and an hour afterwards I repeated the dose of morphine. Those two doses carried her through the day. With some one-eighth of a grain of morphine has the effect that one-half a grain has upon others.

The suspension of the action of the salivary glands by atropine is an effect which is exceedingly interesting. The mouths of some patients under its influence are as dry as possible. Oftentimes I can fill their teeth without any protection whatever against saliva. In no instance have I used a rubber-dam while the patient was under the influence of atropine. I use a napkin as a matter of precaution, but I often take them away as dry as I put them into the mouth,—I have no trouble whatever. I throw this out as a hint and suggestion to you, and I think that, if you act upon it, you and the profession at large will derive great benefit from it. I presume I have written

one hundred letters upon the subject since last winter, and my large correspondence with the profession all tends to establish the great practical value of this agent. It can be introduced into the system in a variety of ways. You can make a liquid solution of both atropine and morphine, and introduce them into the system hypodermically. I have been experimenting with it in different forms, and always with success. Either method is entirely unobjectionable. In pursuing these experiments I have derived most valuable aid from the suggestions of Dr. W. J. Morton, of this city.

While I am up I would like to direct the attention of the members of the profession present to another discovery which has been made recently by Dr. Köller, a young German ophthalmist at Heidelberg. At a recent convocation of the Ophthalmological Congress in that city he made an exposition of his discovery, which very likely will prove a boon to us in our profession. It is a new local anesthetic. We are all familiar with the properties of coca,—the leaves of the erythroxylon coca. Humboldt tells us in his works how the inhabitants of Peru, who make themselves beasts of burden for carrying merchandise up the mountains to the city of Quito, some ten thousand feet above the level of the sea, require only a pocketful of coca leaves for their subsistence, its tonic influences being of such a high order. It has been introduced into *materia medica* in various forms as a specific in that direction. Heretofore we have known it in the form of leaves, decoctions, or extracts. M. Niemann found in coca a new alkaloid, which he named cocaïne, with the formula $C_{32}H_{40}N_2O_8$. One kilogramme of coca leaves gives about two grammes of cocaïne. This alkaloid is bitter, and produces a very decided numbness of the tongue when brought in contact with this organ. It is yellowish-white, and appears in the shape of soft, silky prisms. It is almost insoluble in water, quite soluble in alcoholized water, and very soluble in alcohol and ether. Cocaïne has a very alkaline odor, completely neutralizes acids, and forms with them salts difficult to crystallize. Dr. Köller, in his recent exposition of experiments before the Congress at Heidelberg, made known the fact that a few drops of the muriate of coca, or cocaïne, dropped into the eye ten minutes before an operation, rendered the eye perfectly insensible, so that the surgeon could then perform the most critical, delicate, and severe operations upon it without producing any sensation whatever; and if the operation was prolonged it was only necessary to apply a few more drops of this agent to the organ, and the insensibility would be continued until the operation could be completed, afterwards passing away in the course of fifteen or twenty minutes. I derive my information in regard to this new anesthetic from the last number of the *Medical*

Record, in a letter from its special correspondent, Dr. Noyes, at Kreuznach, Germany, and I would recommend you all to obtain the paper and read it. If it is a fact that we can localize our anesthesia, —if we can induce local anesthetic effect upon the eye and other parts of the system,—I do not see why it may not apply to the teeth and their surrounding tissues, and especially to sensitive dentine; in fact, to all the operations connected with the teeth and mouth. We are very apt, when a discovery is made of importance equal to this, to jump at hasty conclusions, and think we have discovered the philosopher's stone, and that we have found a universal panacea. Your experience will bear out mine when I say that oftentimes we find before we are far advanced in the matter a shadow comes over it, and the utility we fancied we saw is obscured. Nevertheless, this may prove all we hope for in the premises. At all events, I would advise our investigating the matter thoroughly. Cocaïne bears the same relation to coca that quinine does to Peruvian bark, or morphine to opium. I do not think it will prove comparatively of greater expense. Dr. Squibbs, of Brooklyn, is already manufacturing it; so are Foucar & Co., of this city, from whom it can be readily obtained. From the sixteenth century to the present time coca has been the subject of learned essays by the most eminent men of the day. Dr. Monardes, of Seville, as early as 1565; Linnæus, the celebrated naturalist; Humboldt, and others have testified to its remarkable qualities. In Peru, from the earliest times, it has ever been regarded with a sentiment of veneration, and is characterized as the "Divine Plant." Prof. O. Reviel terminates his article on coca by saying, "Much still remains to complete the physiological and clinical study of coca. It is known that it acts upon the sensory and motor nerves. *This substance will some day have an important position in therapeutics.*" In the light of Dr. Köller's discovery, these words seem truly prophetic. Moréno, in 1868, showed that local injections abolished reflex movements for a time, and Von Anrep, in 1880, showed that the sensibility of the skin was abolished *when hypodermically injected*, and that of the tongue when touched with strong solutions. The same author applied a solution containing one-half a milligrame to the conjunctiva, and found that it caused a temporary dilatation of the pupil, which was increased by adding atropine. Strangely enough, Anrep did not note that the conjuctiva was insensible, or, if so, did not appreciate the practical significance of the fact. It is strange, too, that when M. Niemann found that the alkaloid produced a decided numbness of the tongue he did not follow up the hint, and anticipate Dr. Köller's discovery by some thirty years.

Dr. Perry. I was told by an eminent oculist that everything Dr.

Dwinelle claims for cocaïne is true; that, while the operation was performed without pain, the patient was sensible, and not otherwise under the influence of the drug at all.

President Jarvie. We will now listen to John T. Codman, D.M.D., of Boston, who will read a paper on

Inflamed and Sensitive Teeth.

"First principles are necessarily assumptions; they cannot prove themselves," says Froude. Individual instances may be proven by individual observation, investigation, or experience; but the knowledge and application of a principle will solve the method of a thousand cases that would otherwise demand a thousand separate investigations.

My object in offering this essay is to try to present to you the principle that underlies the condition of inflammation applicable to a class of teeth not ulcerated; not aching from exposure of the dental pulp; not even decayed ofttimes, but still painful and annoying, and offering no apparent excuse for their condition,—being teeth classed as aching from obscure causes; as well as the condition applicable to a large number of ulcerated teeth.

Pain is always caused by pressure. This I assume to be a law or first principle applicable to living human bodies. I hardly feel it my duty to demonstrate this fact, but the observation of many years increases my faith in the correctness of this assumption. In this connection pressure is not only referred to as that occasioned by blows or falls and their immediate results, but pressure due also to the reaction from injuries, shown in the enlargement of the part or parts injured, which is due to the increased flow of the blood, lymph, and nervous fluids towards the contused spot. Strictly speaking, there is no such thing as an inflamed or sensitive tooth. Only after years of professional life do I realize this fact. It has taken me so long to thoroughly disassociate the idea of pain in a tooth from what is ordinarily called the tooth—that is, from the actual tooth-substance, the bone, *i.e.*, dentine and enamel—that I may say it is only just lately that I have fairly realized it. Very few of us realize, when we strike the edge of our instruments across the flinty materials that constitute the exterior tooth, causing a spasm of pain to our patients, that these substances have no pain-giving power in them; for, when the members of our profession truly realize it, they will rise to a higher plane of practice, and have clear and unmistakable results, where now they grope in the dark.

Allowing these premises to be as stated, it is reasonable to ask the question, Whence comes pain, and where is its source in a tooth?

The answer is, always and every time, from its fleshy constituents, and never from any other source. Try, then, to thoroughly realize that the lime and other mineral products of which the enamel and dentine consist have not a single element of pain-producing power in them; and then let us in our minds divide a tooth into two parts, and we have then, as is the fact, one part, the bone part, non-sensitive; the other part, the flesh part, sensitive. Consequently, all the tooth pain must be in the part which is truly flesh and sensitive. In this condition of mind we are ready to approach the subject of inflamed teeth, and will be able to comprehend at once that two conditions exist that may cause sensitiveness—in other words, inflammation—in the fleshy constituents that lie in and around a tooth; these being the only tissues that can be sensitive; the one condition being pathological, connected with the flesh part, and the other mechanical, connected with the mineral part; both occasioned by pressure, but from widely different sources.

I have been for years studying to realize practical results from this theory, keeping always first principles in sight, and getting a clearer vision as I proceeded. Simple as this theory appears, there is in it a wide field of study. It will be found to be a "high science," for it involves within itself conditions produced by mal-occlusion; results of accidents occasioned by falls, blows, and injuries; inflammation of the periosteum; congestion and ulceration of the same; inflammation of the pulp; strangulation of the pulp, and congestion of the same; dental abscess, etc.

Having disassociated the idea of pain from the bony tissues of the teeth, we can more easily associate the teeth with the mineral kingdom, and can look on a tooth as a block of marble, a piece of stone, or anything truly hard that is placed in the jaw to crush food with.

We have thus two different ways of looking at a tooth, corresponding to the two different substances of which it is made,—the one way as a sensitive and often a very highly sensitive organ, and the other way as an entirely non-sensitive one. Having made these distinctions clear to our minds,—a thing harder to do than at first thought it would seem to be,—we will proceed to consider the causes of sensitive teeth; or, in other words, the over-sensitiveness in the fleshy constituents of the tooth organism and its immediate surroundings. Two principal causes here exist for sensitiveness,—the one physiological, or pathological, if you prefer the latter word, and the other mechanical, or produced by mechanical means or causes; usually induced by the mineral irritant, the hard, unyielding bone of the tooth; non-susceptible to pain in itself, but productive of any amount of pain as a mechanical irritant when in

the way of nature's plans or standing between cause and effect. So closely are these results allied to physiological causes that we may write it down as an axiom that *all pain in a tooth that does not come from diseased conditions is produced by mechanical irritation.* By diseased conditions, in this connection, I mean inflamed and dead tissues, and I count congested pulps as dead tissues, as they are dead to all their uses, and can only pass into a stage of decay.

The so-called periosteum, which lies beneath and around the ends of the roots of the teeth, is a sort of cartilage or cushion, being between two bones, as cartilages are; and I find that the firmness of the tooth is dependent on the thickness or the thinness of this cushion, and more motion will be found if the periosteum is thick. It is elastic, and has the power of being compressed; but, in order to increase its compressive as well as its expansive power, nature has penetrated it with numerous blood-vessels, that enlarge it or contract it by the ebb and flow of the blood currents. Inflammation gives notice of disturbed normal conditions.

The question is often asked and labored attempts are made to answer it, What is inflammation? My answer would be that *inflammation is an attempt of nature to cure an injury.* There is always an injury done before inflammation sets in. Then nature enlarges the vessels that carry pabulum and remove retrograded tissue. Inflammation cries ever, "More room, more room!" The larger the injury, the more room she wants and needs. There is the dead wood to gather and burn up, and she cries out, "Inflammatio—I burn." The dead matter that is not forced to the surface or carried off to other portions of the system is burned up in what is truly inflammation. In the meantime the pabulum-carriers and the tissue-builders, rushing along to do their work like a crowd in a thoroughfare, cause pressure on the nervous tissues, and they give notice to the storehouse of force, the brain, of the extent of the disturbance or injury.

Inflammation is always in the fleshy parts, to which dental pulps and periosteum belong. We therefore direct our thoughts to these parts, seeking in them the cause of their irritation and pain. So much has our seeking been in this direction for the cause of inflamed teeth, that the fully as important, and, under the circumstances, the much more important, cause, mechanical irritation, has been largely overlooked, and therefore we should now give our thoughts to this branch of our subject; for I would like to convince you, as I am convinced, that *all the inflamed and ulcerated teeth not having their cause in the deterioration of their pulps, and the poisoning of the periosteum from contact through the circulation with their retrograded tissue, come from this cause.* This seems a broad statement, but I do not make it for effect. Neither do I make it without due consideration.

Indeed, I have been hoping that some other would have made it before me, and that I might confirm his judgment with my own. Not as an experiment, but after repeated trials and repeated successes, I offer this conclusion as one of the results of my years of professional study and practice, and trust the future experience of the profession will thoroughly confirm and justify it.

To cure the primary condition of inflammation from mechanical causes is an easy matter when understood. It is simply to get room and rest for the changed condition of the periosteum. It is to observe the articulation and correct it, to distribute the strike or occlusion evenly over the teeth, and particularly to diminish the strike between the inflamed tooth and its antagonist until it becomes neutral or does not strike at all; doing it rightly, sometimes not trimming off anything from the inflamed tooth, but all from its antagonist in the opposite jaw; sometimes taking all from it, sometimes dividing the loss of inert substance between the two, and very rarely filing or grinding enough to expose any sensitive surface. It does not need that I should explain the mechanical means at hand to shorten teeth.

I know my critical friends on my right hand and my left will say that a tooth is *not* an inert substance. But in affirming that it is, I take into consideration the thorough knowledge of my audience on dental subjects, and trust in return that I shall have credit for so much of the same as not to be taken up on this technical point, as I have more regard for results than for theories.

To further explain, I will suppose a case. A patient comes in with an inflamed tooth, suffering from a dull, steady pain. It will probably be in the morning. The tooth, on examination, appears to be healthy in every respect, only there is pain enough to disturb the patient, and he thinks that it threatens more pain. The cause seems ambiguous, and the question comes, What shall we do? "Paint the gum with iodine," says one. "Put on a mustard leaf," says another. "Drill into it," says a third. "It is a pulp stone," says a fourth. "When a patient comes in with an aching tooth," said an old dentist to me, when I was younger than now, "I do *something*. The patient feels better satisfied if you will do something for him." And so the tooth gets better or worse soon, and if nature relieves it by removing the cause for the time being, the iodine, or the mustard, or what not, gets the credit of the cure.

Should a similar case come into my office, while I am washing my hands, in the patient's presence, I will ask this question: "When did this pain first come,—at night or in the morning?" The answer will almost decide the cause, if the patient declares it to have come in the morning on awakening; for, if the pain is what is

termed neuralgic,—that is, sympathetic with some other portion of the nervous system under pressure,—it will not come on after a night's rest, when the system has been recuperated, and the nervous force has been replenished by sleep. The next question will be, "Does the tooth feel larger than the others?" If an affirmative answer is given, the diagnosis is, for the present, closed. The cartilage, which is placed between the tooth and jaw, to receive the shock of closure of the jaws, is swelled by the flow of blood that is there to bring pabulum and to carry away the retrograded tissues; for pain, I argue, always destroys some portion of the tissues. But, in this case, why is this flow of blood to the periosteum? Simply because there are almost no perfect articulations of the natural teeth, and the patient during the night, in dreaming, from mental cares, indigestion, or other causes,—any intense mental or physical emotion will produce it,—has brought his jaws together with too forcible occlusion on an imperfectly articulated tooth, pounding and inflaming by this means the underlying fleshy tissue. Remember, now, our lesson that the fleshy tissues alone give pain, and that the tooth is now a mechanical irritant, and the cure must be effected in a scientific, mechanical way.

When the periosteum, pericementum, cartilage, or whatever it may please us to call it, is once inflamed by a strain or a blow, after occlusion of the jaws, be it never so slight, it will increase the inflammation, until the cartilage reaches a point where a static condition sets in, and congestion, dental abscess, and fistula are the natural sequences, unless the cause be removed before it reaches this stage. If any one desires to try the effect of mental and physical exertion on the closure of the jaws, let him try to lift a very heavy weight or get tremendously angry with his mouth open, if he can. The jaws automatically close with great firmness under such circumstances.

As a practical suggestion, when your patient says the aching tooth feels longer than the others, it is so. It is not the effect of imagination. It is a plain matter of fact. It may have had a mal-occlusion for a long while, and the exalted sensibility occasioned by irritation had just revealed it. The only way to cure it is to shorten this bone,—this inert matter, looking at it from the mechanical side,—and thus rid the periosteum of its irritant. Half measures will not do. The articulation must be reduced to nothing; in other words, so that when the jaws are occluded the patient is not aware of any strike against the inflamed tooth. The relief is immediate. Expressions of gratitude will come from innumerable patients. Not the least of such was one to me from a lady who declared I "ought to be sainted."

There are occasionally times when the tooth is too lame to have this operation performed. Rest for the tooth—meaning always the periosteum—is required, and must be accomplished by other means; that is, the tooth must be relieved from all pressure, in order that the engorged tissues shall have time and not be disturbed while relieving themselves of their surplus fluids. In such cases a cap of gutta-percha, placed on the neighboring teeth to prevent closure of the jaws, is suggested. Sometimes a bit of wood or a toothpick to hold between the teeth affords gratification to a business man who is often obliged to talk.

Time forbids too much detail, but this rule we should bear in mind: When grinding off projections or cusps, cut them always towards horizontal planes, to allow for the lateral movement of the under jaw, or a failure will be made; for when the jaws are in repose the mal-articulation may not be felt; but on making a lateral movement it may be severely felt. Do not think that this easily-described operation is easy to perform. It is, on the contrary, at times quite difficult. It demands a great deal of study and often much time to rightly perform the operation, and you will with great care quite often mistake the points of occlusion; and you will be much surprised at the surplus material you will have to remove from the antagonizing teeth.

What ought to be done when the tooth is ulcerated? If the same cause exists,—and it almost universally does,—proceed with the same remedies. A thorough ulceration cuts off all the vitality of the pulp; but I am satisfied that the death of the pulp is occasioned by the periosteal cartilage being so engorged with circulating fluids that it presses upon the minute vessels that pass through the foramina to the interior of the tooth, thereby cutting off the circulation and producing stasis in the pulp, as a string would if tied tightly around my finger. That is, I consider this condition the most common,—more so than that the inflammation is first conveyed from the pulp to the periosteum. Empty the tooth of dead tissue and vicious fluids; put a lance to the exterior swelling, if necessary, and give the tooth rest from all pressure. When the tooth shows that it has recovered from its shock by its restoration to normal feeling, refill without pounding on it, unless you wish a return of the trouble. Should there be a tendency to a return of inflamed conditions, have the patient return at once, so that your work may be reviewed, and most likely you will find that your filling shows a bright spot on it, indicating that there is an uneven occlusion with its antagonist, or that the articulation has changed. It so, grind off the bearing spot or its antagonist the thickness of a sheet of paper, or until the patient says "it does not hit now for

sure!" The patient knows every time when it does *not* strike, but cannot always tell you when it does strike; and if he cannot tell you that it does not strike at all, you may conclude it still strikes.

"The pericementitis resulting from long and severe malleting upon a pulpless tooth may be relieved with a preparation of aconite and iodine," says a learned professor. To my mind, a dentist who thus pounds a pulpless tooth should be relieved of his diploma. It is generally admitted that a permanent change takes place in the periosteum after severe inflammation. Something like weakness remains, often for a very long time. If a permanent thickening takes place, a permanent loss of tooth-substance, when the articulation is close, is founded on a scientific basis.

When we have accomplished this great fact; when we have at our fingers' ends the means of giving relief from pain so annoying, so aggravating as the continuous grinding of an inflamed and ulcerating tooth; when we can to a very large extent relieve this suffering without extracting; when we can check and scatter the inflaming forces, and make the angry tooth become again quiet, and remain so, and can make the name of ulcerated tooth not a hissing and a scorn, but something within the bounds of reasonable cure, we can claim that we have gained a portion of the "high science" of dentistry which will surely elevate us above mere tooth-fillers and tooth-pullers. Is it immodest in me to claim that I have had a great measure of success in the class of cases described? I think not; for I offer to all the theory or principle by which I have accomplished these results, and ask only in return, and for the benefit of those who suffer, a thorough study and application of the principles embraced in this paper, knowing that by so doing you and your patients will receive a satisfaction far beyond your present estimation.

President Jarvie. Gentlemen, I am sure you have listened to this paper of Dr. Codman's with a great deal of pleasure. It is a subject that interests us all, more or less. Dr. Rich, you have had about as long an experience in treating such cases as any one in the room. Can you add something to our knowledge respecting them?

Dr. Rich. There are no new methods mentioned in that paper. I have no remarks to make upon it. This condition of inflammation has no mystery about it, and we can in most of the cases presented to us arrive at the cause, and in most of the cases it will be found to be the result of undue pressure. I suppose it is the experience of all of us that we have been able to relieve certain conditions of inflammation by relieving the pressure. One way of relieving the sensitiveness produced by pressure is to impose some-

thing between the other teeth for a time. There are rare cases where we cannot diagnose the cause of the suffering.

Dr. Brockway. I like this style of paper because it is practical. Whatever may be the cause of this condition in which we find teeth, and which we have often found so difficult to relieve, I am satisfied that the suggestion given in the paper of relieving the pressure by changing the occlusion is a good one, and in most cases it is the thing to do. Before we had the dental engine that was sometimes a quite difficult and painful operation, for then we had to depend upon the file, and gentlemen who have been in practice as long as many of those I see around me know what little effect a file has on the grinding surface of a molar tooth; but with the dental engine and a corundum stone, kept liberally supplied with cool water, the operation of shortening the offending tooth, or its antagonist, as the case may be, is comparatively easy, and in my hands it has almost always proved effectual. I sometimes supplement that operation by applying phénol sodique or wine of opium to the neck of the tooth. That may be empirical practice; I don't know but it is, but it seems to have a good effect.

Dr. Rich. I do not know that I have ever seen a case of that peculiar soreness that was not to be attributed to pressure from some mal-articulation of the teeth. I recall one case, which is a type of many. A young lady, eighteen or nineteen years of age, complained very much about the soreness of a first bicuspid. It ached or pained her all the time, and sometimes she could not bite on it. I questioned her as to what time she felt this pain most severely, and I found, as I expected, that it was in the morning. I examined the tooth and found that it so articulated with one of the under teeth as to receive the whole force of the jaw when the jaw was in a certain position. It is the habit of some people to hold their jaws closely and tightly together while they sleep, and in such a case the tooth that received the greatest amount of pressure would be the sorest in the morning. This lady evidently exerted all the strength of her jaws upon that one tooth during the night. The difficulty was remedied by making the teeth articulate properly, thereby removing the pressure from the sore tooth, and within two or three days the soreness disappeared and has not returned. That mode of treatment is not new at all. It was not original with me. I have for a great many years known of that method of relieving those inflammatory conditions of teeth that arise from undue pressure. I know that this matter of the proper adjusting of the antagonistic surfaces of teeth, so that there will be no undue pressure upon any one tooth, is not attended to as it ought to be by many practitioners. I have often found that difficulty in the case of

patients who had been in the hands of dentists of some reputation. When there is pain in a sound tooth, one would think the first thing a dentist would do would be to look for something of that kind; when he had good reason to believe it did not arise from a dead pulp, it would naturally be attributed to undue pressure and concussion from improper articulation, as it could hardly arise from any other cause under ordinary circumstances. I do not see anything novel in that mode of treatment. If there is pain produced by pressure, it is always upon the periosteum that the pressure is exerted, and there the inflammation will be found to exist. The remedy is to relieve the periosteum of that particular kind of pressure by relieving the tooth from the pressure of the jaw.

Dr. Codman. I have not pretended that there is anything new in this treatment, or in this theory of the cause of the trouble, but that we have not gone far enough in the science of diagnosis to discover every time what the trouble is; and I think many dentists are afraid to resort to that mode of treatment, fearing their patients would give them a bad name, while, on the contrary, their patients would really look upon them with more esteem, and as knowing more than they had given them credit for. It is often said to me, doubtingly, "How can you relieve a tooth by grinding? How can you get rid of the pain by this process?" I say, "Just let me show you how, and in the course of three minutes you will approve of my treatment and say I am correct; when I take off the thickness of a sheet of paper, you will perceive that I am on the right road." That is really the result. I will guarantee to say whether the articulation is bad or not by simply looking at the teeth. As a usual thing, when such teeth strike together, you will find them highly polished at the points of occlusion. There will be a polished surface at the points that are hard pressed on that you will not ordinarily see in a correct occlusion. Another way of discovering it is to place your finger on the tooth and ask the patient to close the mouth; and if that tooth moves by contact with the opposing teeth, it is badly articulated, and the articulation should be altered.

Dr. Rich. I do not admit that the profession are so ignorant of the principles of mechanics and articulation as the gentlemen would have us believe; or that this method of treatment is not generally followed; or that any man of reputation would be afraid to adopt it. As far as I am concerned, if in my judgment it is necessary to do anything for the benefit of my patient, I do it; I do not care who says anything about it. I am going to have my way, or I am not going to treat it at all. I do not stand in any fear about the result to myself of any treatment I propose. Anybody who thoroughly understands the principles of mechanics and articulation

will be able to discover if the inflammation in a tooth is occasioned by misapplied pressure to any one tooth by examining their surfaces. A polished surface is always present at the point of contact, and those surfaces are always beveled off when the articulation is imperfect. This is no new thing at all, and it is a condition that the members of the profession have not been afraid to attend to and remedy in that way for thirty-five or forty years. Bring the teeth together, and if there is an imperfect articulation, causing one to shove the other out of the way, it will produce an inclined plane. If you cannot see it in the mouth, take an impression of the mouth and examine the surfaces of the cast made from it and you will see it in a moment. In the ordinary course of wearing down the back teeth, the front teeth of most persons are brought into such a condition that inclined planes are produced. That is no new thing, and the remedy is very simple. Oftentimes it has been remedied by placing hard fillings on the crowns of the molars that would relieve the pressure on the particular tooth that was sore. There have been other devices to remedy it.

Dr. Dwinelle. I fully corroborate everything that Dr. Rich has said. I think I have gone over the field as frequently as any one present, except, perhaps, Dr. Rich. We can always ascertain where the point of undue occlusion is by introducing between the teeth pieces of carbonized or transfer paper; the point will be indicated certainly and absolutely. If an incisor is the seat of inflammation, we can always relieve it by building up upon the grinding surfaces of the molars.

Dr. Brockway. I think we are somewhat in danger of doing injustice to the essayist in assuming that he thinks this mode of treatment is new. He has positively disclaimed any such idea. The object of the paper, as I understand it, is to impress the treatment suggested more upon the minds of some practitioners. I realize the force of his statement that there are some dentists who have not the boldness, so to speak, to do this thing. I have seen such cases pass from the hands of good dentists unrelieved,—not, perhaps, from a lack of appreciation of the case on the part of the operator, but from want of boldness in applying the remedy. It is true that patients often have a fear of injury being done to their teeth when the cutting away of any portion of them is suggested. When, therefore, I deem such an operation advisable, I tell my patient that I can relieve him by the "grindstone cure," as Dr. Requa has termed it, and this usually removes all apprehension, so that I can go on and do what I wish to.

Dr. J. W. Clowes. The paper just read is an eminently practical one. That it is not altogether new does not detract essentially

from its excellence. We may feel that we know much, and may claim familiarity with the detail and practice of the methods so ably set forth; but we should not forget those of our profession (without our favoring conditions for thought and observation) who will be encouraged to think, and will receive and apply the knowledge this paper imparts. We have not to go beyond this associate fold to find those who lack the courage to cut and shape the sacred constituents of the natural teeth. If fear to do this is a restraint among us, how great is the need that some brave voice should go out from here to counsel and direct! The words and the utterances of our brother this evening are brave and they are true. The timid will learn from him that it is not only harmless, but largely preservative, to do what are sometimes regarded as inhibited acts. Antagonism may be an inimical or a friendly condition. Between the teeth of opposite jaws, when squarely met, antagonism is friendly. A robust tooth, from its position, is sometimes made to inimically antagonize a weak one, and in this respect to play the bully. It is for us to intervene and see to it that the helpless shall suffer no detriment. Dr. Codman must not think we are inappreciative and do not comprehend him. We remained undemonstrative at first because we had nothing to say. Having no occasion to oppose his established facts, we remained silent. His disappointment at not being antagonized I can fully understand, for he held reserved forces and wanted to use them. He may regard it as a high compliment that no objection more serious has been made to his paper than its lack of novelties. Had he invented a microscopic and intangible germ to account for the evils he has disclosed, his applause might have been louder, but not so enduring as the approval he has won. I coincide with Dr. Rich regarding the desirability of having papers that are read here thoroughly discussed. If it be not possible to do this on the evening of their delivery, then let it be at the meeting next succeeding. It is lamentable that some of our best productions in the past have been shelved, so to speak, from lack of time, by a conservative snap judgment, and a reckless opinion of its merits by a suddenly aroused sleeper. Let us devise some way in the future to encourage those who are at so much pains to interest and instruct us. We should show by our reception of the good things they bring us that we are appreciative, and know how to honor and respect their earnest endeavor. Let all subjects presented be fairly discussed, and then we may enjoy ourselves, as well as dispense to others, an influence we shall be proud to confess.

Adjourned.

E. T. Payne, D.D.S., *Secretary*.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

Regular monthly meeting, held Tuesday evening, November 11, 1884, in the rooms of the S. S. White Dental Manufacturing Co., corner of Broadway and Thirty-second street.

President A. L. Northrop in the chair.

Dr. C. F. W. Bödecker, chairman of the Clinic Committee, reported that the usual clinic was given in the afternoon. Dr. Timme, of Hoboken, demonstrated the use of a continuous-gum furnace (the Dunn furnace, made in Chicago). The furnace is heated by gasoline, and seems to work exceedingly well. Dr. Timme repaired a block of gum teeth in nineteen minutes, including the time of heating up the furnace. Dr. Bödecker exhibited the block so repaired, which, considering the short time occupied, he thought was very nicely done. Dr. Rynear set one of his molar crowns for a gentleman, performing the operation in a very short time and very neatly. Dr. A. J. Reinhold also presented a case at the clinic—a boy about fourteen years of age, whose superior incisors were broken by a fall about three years ago, a part of the crowns being lost, and the pulp subsequently dying. Dr. Reinhold asked advice as to whether the crowns should be built down with gold, or pivot crowns set. Dr. Atkinson advised the latter operation. Dr. Parmly Brown advised the building-down operation. He said the roots were probably soft, and would not hold pivots many years; therefore it was better to restore the crowns with gold, which would last for a number of years, and then pivot crowns could be set. Attendance at the clinic was between thirty-five and forty.

Dr. Bödecker, of the special committee to solicit subscriptions for the benefit of the family of the late Dr. Marshall H. Webb, reported that the American Dental Society of Europe, which met at Vevey, gave four hundred marks,—a little less than one hundred dollars,—and Dr. H. Nieriker, of Zurich, contributed sixty francs, or twelve dollars. The sum subscribed in this country was three hundred and twenty-six dollars, which, added to the European subscriptions, made a total of four hundred and thirty-eight dollars, which had been forwarded to Mrs. Webb, and her receipts returned therefor.

The report was accepted and the committee discharged, with thanks of the society.

Incidents of Office Practice.

Dr. Wm. Carr. I would like to call your attention to the newly discovered anesthetic, cocaïne, that has recently been successfully used in operations upon the eye and throat. During the past week I have used it for sensitive dentine in thirteen cases. In nearly

every case, in from three to five minutes after applying it, I was enabled to excavate without pain to the patient. I have used a two per cent. and also a four per cent. solution. I prefer the four per cent. They can both be obtained at Sayre's, corner of Forty-sixth street and Sixth avenue. My method is to first adjust the rubber-dam; then apply to the tooth some cotton saturated with cocaïne, and leave it there four or five minutes. I begin to excavate almost immediately, and in most cases the patient does not feel it. I attempted to extirpate a pulp by its use, but failed. However, I think it not unlikely that we shall be able to extirpate pulps with it without the use of arsenic.

Dr. C. A. Woodward. I undertook to extirpate a pulp in that way, and made four applications of cocaïne within an hour. At the expiration of the hour I found the pulp quite as sensitive as when I began. I have tried this agent in seven or eight cases of sensitive dentine. In one case the patient informed me that there was a slight difference after the application; the tooth was not quite so sensitive as before; but in the other cases it had no effect. I used it in a strength of two per cent. Probably it was too weak.

Dr. Bödecker. Mr. President and gentlemen, there has been lately a great deal of controversy about the new mode of filling teeth, the Herbst method, which is simply a method of putting gold into a cavity by the use of smooth engine burnishers, and in that way making it cohere together. A great deal of time is saved by this method. How far it is practicable, or whether it is adapted to every case, I am as yet unable to state. This much I can say, that when it is applied to a certain class of cavities I think it will be a boon to the dental profession as well as to patients. Some gentlemen who have tried this method have failed to see any benefit in it above the old method of malleting, or other methods of packing gold. I think their failure to see its merits is mainly due to their not understanding certain principles necessary to a successful use of this method. As I have stated these principles, as far as I know them, in a paper just published in the *Independent Practitioner*, I will, if you will permit me, read some of the most important points. [Paper referred to read by Dr. Bödecker.]

Dr. Frank Abbott. I would like to ask how much time, in proportion to that occupied in putting the gold in the teeth, is required to prepare the matrices and get ready to do the work of filling.

Dr. Bödecker. It differs in different cavities. In a bicuspid which is very much broken away, and where, if you used the mallet, a great deal of building would be necessary, it would require perhaps five or ten minutes to prepare and adjust the matrix. In such cases, where the contour of a bicuspid is gone, I first introduce a

wedge; then take the smooth end of a separating file and fit it around the tooth; one edge of the steel catches hold of the lingual and the other of the buccal side of the tooth. I then push in two pins, and the matrix is complete. In contouring operations of the front teeth I have not experimented much, and I do not know that I should venture to do that kind of work there, but in approximal cavities of molars and bicuspids and front teeth, I think this method is one of the most valuable things that has ever been brought before the profession.

Dr. S. C. G. Watkins. I would like to ask Dr. Bödecker if a matrix could not be made of a piece of copper plate, by wrapping it around the tooth and tying it there with silk floss, very much easier than in the way he has described.

Dr. Bödecker. A gentleman in Boston called my attention to that kind of matrix. I tried it, and it works very well; but why go to the trouble of tying floss silk around the tooth a dozen times? If you use a piece of steel, you can take it off in a minute for the purpose of examining any imperfection, and put it on again. It is very easy to hammer out a piece of steel and conform it to the shape of the tooth. Copper will do very well, but it gives more trouble.

President Northrop. Will Dr. Bödecker tell us if there is, considering the time required to prepare for the operation, any advantage over the methods we are now using? Will it save time and can we serve our patients better by packing gold in that way than if we followed the ordinary methods, with the gold we are now using?

Dr. Bödecker. I hope that in time we will be able to use our American gold with the same advantage, but I have not as yet found any American gold that worked quite as satisfactorily as the German gold I have spoken of, and which can be manipulated with such remarkable ease. I have given some of that German gold to several gentlemen in this city and in Boston, and all who have used it have been astonished and delighted to find that gold can be worked with such ease. It works almost like butter.

Dr. Carr. I have used a little of it, and I never used any other gold that I was so well pleased with as that, so far as its softness is concerned. In that respect I believe it surpasses anything else I have ever used.

Dr. J. S. Latimer. To what do you impute that softness? Is there anything special about the gold itself, or is it simply due to a looseness of texture or corrugation?

Dr. Carr. In manipulating it, it seems like a piece of putty. You can carry it to the cavity with greater facility, and it adapts itself to the walls of the cavity better than any other gold I have ever used. That is what I mean by softness under the instrument.

Dr. Abbott. It seems to me that there are certain points to be considered in this method of filling teeth. One object the gentleman who introduced it had in view was the saving of time; a very important matter for busy dentists to consider. That time is saved by his method of packing gold I have no doubt; but that any one who adopts that method would, in the beginning, save time, I doubt very much. One of the main features in the proper manipulation of the gold, in making a filling in the manner described, is the matrix and its nice *adaptation* and *solidity* in position. If there is the least movement of it the filling will be injured seriously,—so seriously, in fact, that if I was making such a filling, and when half completed the matrix moved, I should be inclined to take it all out and start anew. While these instruments may be used by Dr. Herbst and Dr. Bödecker with ease and precision, in my hands they would probably knock this matrix arrangement one way and the other in no time, and I probably could not accomplish anything satisfactorily with them. It is not an easy matter to fit a piece of steel between two teeth, or twist it around a tooth, so that it shall remain perfectly firm, like a part of the tooth itself. These are not objections to the Herbst method, but points to be considered. The fitting of the matrix, and the general getting ready for the introduction of the gold, would probably consume more time with a beginner than he would occupy in doing the entire operation in his accustomed way. Rapid operating in this or any other method is a matter of practice after learning how. This method may be very useful after one becomes accustomed to it. There is one advantage obtained in using instruments of this kind and in the manner described,—*i.e.*, rubbing of the gold against the walls of the cavity, thus preventing injury to the tooth from mallet blows.

Dr. Bödecker. With reference to the supposed difficulty in applying the matrix, which has been spoken of by Dr. Abbott, I will say that I practiced the Herbst methods while in Europe, and since I returned I have filled approximal cavities in molars and bicuspids in no other way, and I assure you I have no difficulty whatever in adjusting the matrix so that it is perfectly secure. But in my pamphlet I stated that, if a screw-matrix I am experimenting with proves to be a success, any slipping or displacement of the matrix will be impossible. I have just fixed a matrix temporarily on this cast [exhibiting]. The pins are not quite large enough. Therefore, it is necessary to have pins of different sizes. Any kind of pins will answer the purpose; anything that will secure it in place. A matrix that goes around the tooth, grasping the buccal and lingual sides, will not slip at all.

Dr. F. Y. Clark. I must again say what I said at the Saratoga

meeting—that history is repeating itself. I think, from what has been said to-night in regard to this so-called new method, that it is not very different from that practiced when I first entered the profession. At that time we were able to get a kind of gold that cannot be had now. I do not understand why, but I have not been able to find that peculiar kind of gold for more than thirty years. In Abbey's lifetime I asked him on one occasion if he had any secret in the manufacture of his gold. He said, "I don't mind telling *you*, doctor, but I would not like to have it noised about at home, for there are a good number of Quakers in Philadelphia, and it is rather doubtful if they would hear of my pounding the Bible without trouble. When traveling in Italy I bought an old Bible in manuscript, and my soft foil is beat out between the leaves of that Bible. I am very careful of it, for I believe it has much to do with producing the soft foil you refer to." This was along about 1854, and he was then making very soft gold,—soft, tough, and velvety,—and I think very much like the gold Dr. Bödecker speaks of. In packing it we used plain, blunt points, almost like burnishers, and of large size. With this gold I inserted fillings in those days that I cannot begin to put in now. I do not know the reason, unless it was in the foil. I occasionally see some of those old fillings now which look good and solid, and I doubt if the fillings I am putting in now will look as well after the same length of time has elapsed. Many of the beautiful fillings of the present day, which consume so much time, if cut apart and viewed under a microscope of low power, would look as though they had been through the measles or small-pox. I think in these days *many are shortening their lives by trying to fill teeth instead of trying to save teeth.* We should study more how to do saving rather than ornamental work. I believe the gold made by Wolrab is very near the same as that manufactured by Mr. Abbey about 1854. Since this matter was brought to our notice by a paper read before the Odontological Society of New York, about a year ago, by Dr. Fillebrown, and discussed at the Saratoga meeting, I have been experimenting, and have succeeded in a few cases beyond expectation. In making matrices I use hard rubber strips, which are prepared a little thicker than paper. One of these strips is forced between the teeth and marked on each end; then removed and cut a few lines beyond the marks. By heating, the ends can be turned so as to clasp the tooth. When forced in place you have something that will stay. If Dr. Bōdecker will try this, I am sure he will find it preferable to steel files. Dr. Phelps, of Columbus, Ga., is here, and I remember seeing him fill teeth many years ago. He put some fillings in my mouth in a peculiar way that I never saw anyone else practice. I would like to see him fill in the same way

at one of our clinics. He is quite modest and averse to notoriety; but perhaps he will describe his method.

Dr. George Phelps. I do not know that I have anything to say of much interest or importance, as it is doubtful whether my mode of filling would be of any special advantage to others. I have used soft non-cohesive gold foil about thirty-five years, in the form of elongated spheroids or truncated cones. They are made by folding the gold and rolling it round loosely between the thumb and index finger, from one sheet of number four up to five or six, and cut from the roll of sufficient length to extend from the bottom of the cavity one-third or more beyond the orifice. The cavity is excavated on the principle known as dovetailing in mechanics; consequently retaining pits would be objectionable. Small pliers and other little instruments are used in shaping, adjusting, and holding them in place. Beginning at the cervical portion in approximal cavities, and condensing laterally until the filling is formed, then openings are made in various places and smaller cones forced in, after which the gold is riveted down with automatic mallets until most of the surplus is condensed into the cavity; then finished as usual. A filling of this kind requires a great deal of practice to accomplish successfully, and is not made by chance; neither is it necessary to sacrifice tooth-structure to make the operation practicable in approximal cavities, as is frequently the case in using cohesive gold. In large compound cavities and elongations this mode is not so reliable, and in such cases I use cohesive gold and the instruments in common use, but rarely cohesive and non-cohesive gold in the same cavity, especially in contracted spaces, for obvious reasons. Specimens of fillings made by the Herbst method, on exhibition here, seem to require liberal cutting and large openings, which would be a disadvantage in the way I use soft gold. I learned this mode of filling from Dr. O. P. Laird, who was a contemporary of Dr. Parmly, and I have seen approximal fillings made, as I have described, in bicuspid teeth, forty-five years ago, still in good condition. Those fillings were made entirely by hand pressure; but now the mallet is of great assistance. The gold being soft, expands while it is riveted into the cavity, under the magic influence of mallets, and hermetically closes it and prevents leakage. Witnessing operations by my friend, Dr. Atkinson, many years ago, gave me an impetus in this direction, as previously I had been too timid. After adopting the use of the mallet I made better and more satisfactory fillings, with less fatigue to myself and patient,—in fact, up to my ideal.

Dr. Clark. When I first saw Dr. Phelps's instruments I never suspected they were made for filling teeth. I should like to see some of the operators here fill a tooth with instruments I have seen him use.

Dr. Phelps. I have an advantage over most operators, owing to the fact that I am ambidextrous and can change from side to side. This facilitates my getting at approximal cavities with simple separations and without cutting the tooth away to make approaches to the cavity. The instruments referred to by Dr. Clark I made myself, and they are designed especially for this mode of operating, which requires instruments of great precision when so little of the structure of the tooth is cut away to make the cavity accessible.

President Northrop. Do I understand you to say you never cut away a tooth to make space?

Dr. Phelps. Only the friable portion; not to facilitate operations.

President Northrop. If you had a distal cavity in a molar, have you instruments with which you can reach and fill it without cutting?

Dr. Phelps. In such cases, and all others if necessary, when I diagnose small cavities between the teeth not involving the grinding surface, I do not make compound operations, but tie a knot which makes a space in a few hours, after which I pack cotton saturated with gum-sandarac to press them still further apart, and maintain the separation for several days without irritation; then I fill, and the teeth soon return to their natural positions. At the same time, I am careful to instruct my patient to floss the surface daily, which insures cleanliness.

Dr. W. T. La Roche. I am a poor talker and a bad artist, but I will endeavor to give you an idea how I fill a tooth. I have filled teeth for about thirty years, and have always used one method of introducing gold. I believe that many operators oftentimes undo their work by going from one place to another in packing the gold. I have used cylinders all my lifetime to a certain extent, and have them in different numbers, from number one and two up to six,—that is, six sheets of gold rolled around a small broach, the broach being taken out and the cylinders cut off in different lengths. In starting a filling I use one, two, or three cylinders, according to the cavity. [Dr. La Roche illustrated his method on the blackboard.]

President Northrop. Dr. McClelland, of Louisville, Ky., is with us to-night, and we would like to hear him. We have not heard his voice in many years.

Dr. McClelland. It rather embarrasses me to be called upon to make remarks upon this subject. I am one of the old-school practitioners, and I have had the pleasure of seeing fillings of mine, made of Abbey's soft gold, as described by Dr. Clark, that have stood for twenty-five years. I am indebted to Dr. Hunter, of Cincinnati, for my early success in filling teeth with blocks. I think young dentists fail more frequently in approximal cavity fillings,

whether in bicuspids or incisors. The lower incisors are very difficult to fill. There is not much tooth-substance to spare when there is an approximal cavity. I will try and give you an illustration of how I would fill such a cavity [drawing on blackboard]. In preparing the cavity I am careful to remove all disintegrated, decomposed dentine, and I aim to cut a little pocket here at the cervical wall, and another up here towards the cutting edge of the tooth, as there are scarcely any posterior and anterior walls. Then I make small blocks of soft gold of a size suited to the space for introducing it, being about as long as the cavity is deep. I take a block and force it between the teeth and carry it well down with a blunt instrument; then mallet it down with a step instrument. I do the same thing above with the upper pocket. Having the cavity about two-thirds full, I finish with a small ribbon of gold, carrying it to its place with an instrument transversely bent, and allowing it to extend in loops outside of the cavity, and having fully condensed these loops, I lastly press hard on the ends of the blocks above and below. The same rule will apply in filling superior incisors and frequently bicuspids. It is a good system, and not a new one. I smiled to myself when Dr. La Roche gave that illustration of his method, because I have filled many a tooth that way myself. For about five years I made a specialty of crystal gold. I gave it up because it was a slower method. I can fill with soft gold in half the time. Take one of those lower incisor cavities, and I can fill it in ten minutes. Of course, if the tooth is broken down, and it is necessary to restore its contour, a different method must be used.

Dr. Mowbray. I feel very grateful to Dr. Bödecker for his paper. The Herbst system strikes me as a very good innovation upon our accustomed methods of filling with gold, and I think it will be acceptable to members of the profession, from the fact that I can see that retaining-points cannot be perfectly filled in some little incisor cavities by the old methods, while by that process they can undoubtedly be filled very satisfactorily. But is it necessary that we should import costly Bibles in order that our gold-beaters here may make superior gold? What kind of Bibles do they have in Germany, Dr. Bödecker?

Dr. Bödecker. I have asked the manufacturer of the German gold several times about it, and I hoped he would give me a hint as to the reason his gold worked in such a superior manner, but he did not want to tell me anything about it. He said there was nothing peculiar in the gold itself; that it was merely the different way he had of purifying it; that it cost a little more, and he got a purer article. He seems to keep his process a secret. The gold manu-

facturers in this country laugh at the idea that there is anything in the manufacture of gold that they cannot do, or any gold that they cannot reproduce,—which I hope is true, for it is a rather expensive article when we have to rely upon the German manufacturer for our gold. The import duty is forty-five per cent., which brings the cost of this gold up pretty high. The doctor says it is my fault that this method of packing gold has been brought to the notice of the profession. Perhaps in one way it is so, and in a somewhat funny way, too. About a year and a half ago Dr. Herbst, of Bremen, sent me one of his patients who had several of these fillings in his mouth. I examined them, and at the next meeting of the Odontological Society I spoke of them. When the report of my remarks was printed in the DENTAL COSMOS, the gentlemen of the profession in Germany began to realize that possibly there was something in the method, which before that they did not want to acknowledge. Although they have since treated Dr. Herbst a little better, he deserved still better treatment than he has received. Probably jealousy is the reason of their unwillingness to recognize his method or its merits. I would respectfully request the society to pass a vote of thanks to Dr. Herbst, of Bremen, the inventor of this method. I believe he would be greatly flattered by such action on your part, and not only flattered but encouraged to bring about other improvements and discoveries, if this society and the dental profession at large would give him such recognition. I make that motion.

Dr. Clark. In regard to the Bible question, I would say that in 1854 Mr. Abbey told me that in Italy he came across an old parchment Bible, a very ancient copy, which he bought. We all know that the parchment used in those early times was very different from that which we get now; it was perfectly free from grease, and that would make it very desirable for working gold. I remember that in the South, during the war, I could not get any gold, and I went to work and manufactured it. I procured a few old parchment diplomas, and after rolling the gold out into suitable strips I beat it out as usual, but sometimes it became so harsh that it almost rattled in handling, and annealing did not better it much. I attributed that quality to the grease or something in the parchment. Notwithstanding this difficulty, I was finally able to make tolerably good gold. I think there is a great deal in having the parchment used chemically pure.

Dr. Rynear. I would like to ask whether the Herbst method is dependent upon the use of Wolrab's gold.

Dr. Bödecker. You can use another gold, but not with such advantage.

Dr. Rynear. Then I think this resolution of thanks would be a little imprudent, because it would be tantamount to an acknowledgment that this gentleman in Germany manufactures a better gold than is made by American manufacturers, and that I do not believe. This is a new thing that we have not thoroughly tested. We have tested White's gold and Williams's gold, and found them very satisfactory; and I do not see how we can indorse this foreign article in this way without compromising ourselves. I make this statement not as a member of this society, but as a member of the profession.

Dr. Abbott. I hope this resolution will pass, for the reason that I believe in encouraging every man, no matter who he is or where he comes from, in producing anything that is new and useful.

Dr. Bödecker's resolution of thanks to Dr. Herbst was passed.

Adjourned.

B. C. Nash, D.D.S., *Secretary.*

MARYLAND STATE DENTAL ASSOCIATION.

At the second annual meeting of the Maryland State Dental Association, held in Chemical Hall, University of Maryland, Baltimore, November 13, 1884, the following officers were elected for the ensuing year:

D. F. Pennington, president; David Genese, first vice-president; R. A. Hungerford, second vice-president; W. A. Mills, corresponding secretary; C. C. Harris, recording secretary; Thomas H. Davey, C. F. Dinger, and B. M. Hopkinson, executive committee.

D. F. Pennington, *President,*
No. 536 West Fayette street, Baltimore, Md.

AMERICAN ACADEMY OF DENTAL SCIENCE.

The seventeenth annual meeting of the American Academy of Dental Science was held at Young's Hotel, Boston, Mass., November 5, 1884.

The following are the officers elected for the ensuing year: Geo. T. Moffatt, president; J. H. Batchelder, vice-president; E. E. Hopkins, recording secretary; E. B. Hitchcock, corresponding secretary; E. H. Smith, treasurer; H. C. Meriam, librarian; C. P. Wilson, E. C. Briggs, and J. S. Mason, executive committee.

The annual address was delivered by Dr. E. N. Harris, of Boston.

E. E. Hopkins, *Recording Secretary,*
No. 85 Newbury St., Boston, Mass.

UNIVERSITY OF CALIFORNIA—MEDICAL AND DENTAL DEPARTMENTS.

The third annual commencement exercises of the Dental Department of the University of California were held, in connection with those of the Medical Department, at the California Theatre, San Francisco, on Tuesday evening, November 11, 1884.

The address on behalf of the Medical Department was delivered by Professor F. H. Terrill, A.M., M.D.; that on behalf of the Dental Department by Professor W. E. Taylor, M.D.

The number of matriculates in the Dental Department for the session was thirty-one.

The degree of D.D.S. was conferred on the following graduates by William T. Reid, A.M., president of the university:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
George Washington Cool	California.	Robert Nicol	Scotland.
John Michael Dunn	California.	Gustavus Carl Rietzke	Germany.
Archibald Duncan Gleaves	California.	William Henry Simmons	California.
Elmer Joseph Weldon	California.		

UNIVERSITY OF MARYLAND—DENTAL DEPARTMENT.

At a special meeting of the class of 1884–85 of the Dental Department of the University of Maryland, held November 29, 1884, a preamble and resolutions were unanimously adopted in reference to the death of their fellow-student, R. Brooke Gwathmey, testifying to the genial and manly character of the deceased, who was in "every way worthy of their respect and regard."

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

At a special meeting of the corporators of the Pennsylvania College of Dental Surgery, held December 9, 1884, the following resolutions, presented by the committee appointed for that purpose, were unanimously adopted:

Whereas, Our late president, Samuel D. Gross, M.D., LL.D., D.C.L. Oxon., and LL.D. Cantab., has been removed from us by death, we desire to express our sentiments of regret upon the great loss our institution has sustained; therefore, be it

Resolved, That in our intercourse with him we recognized a courteous bearing and a broad humanity, which crowned and beautified his scholastic and scientific accomplishments, so well befitting his profession.

Resolved, That we hereby tender our sincere sympathy and condolence to his family; that these resolutions be published in the DENTAL COSMOS and *Medical News*, and a copy transmitted to his family.

J. DE HAVEN WHITE,
DANIEL NEALL,
ELLERSLIE WALLACE,
DAVID ROBERTS, } *Committee.*

EDITORIAL.

FOOD ELEMENTS.

A VALUED correspondent requests the publication of some analyses of cereal elements, and the following tables have therefore been collated from a work on "Foods," by Alex. Wyntner Blyth, of England.

There is a growing professional inclination in the direction of experimentation with a view to the correction or prevention of initial physical degeneracy, by the supervised production of improved human structure through prescribed alimentation, during both ante- and post-natal periods; and such scientific histogenesis would seem to be quite within the bounds of possibility.

If the pork and beans of New England, the oatmeal of Scotland, the roast beef of Old England, the black bread of Germany, and the maccaroni of Italy may be said to produce clearly discernible physical and mental characteristics in those several groups of peoples, it fairly follows that in any country the individual is, or may be made to be, the subject of distinct dietary development.

FOOD ELEMENTS TABULATED FOR THE USE OF EXPERIMENTERS IN SPECIAL TISSUE PRODUCTION BY ALIMENTATION:

WHEAT FLOUR.

	Per cent.
Water	14·0
Fat	1·2
Nitrogenous matter, insoluble in water	12·8
Nitrogenous matter, soluble (albumen)	1·8
Non-nitrogenous matter, soluble (dextrine)	7·2
Starch	59·7
Cellulose	1·7
Ash	1·6

WHEAT BREAD.

	Fine Bread. Per cent.	*Coarse Bread.* Per cent.
Water	38·51	41·02
Nitrogenous substances	6·82	6·23
Fat	·77	·22
Sugar	2·37	2·13
Carbo-hydrates	49·97	48·69
Woody fiber	·38	·62
Ash	1·18	1·09

Oatmeal.

	Per cent.
Water	12·92
Nitrogenous matter	11·73
Fat	6·04
Sugar	2·22
Dextrine and gum	2·04
Starch	51·17
Fiber	10·83
Ash	3·05

Rye Flour.

	Per cent.
Water	14·24
Nitrogenous substances	10·97
Fatty matters	1·95
Sugar	3·88
Gum	7·13
Starch	58·73
Woody fiber	1·62
Ash	1·48

Buckwheat.

	Per cent.
Resin	·36
Gluten	10·47
Albumen	·23
Apothem	2·54
Saccharine extraction	3·08
Mucilage and gum	2·80
Starch	52·30
Fiber	26·93
Loss	1·29

Barley Meal.

	Per cent.
Water	15·06
Nitrogenous matter (1·0 to 1·7 albumen)	11·75
Fat	1·71
Carbo-hydrates (sugar 1·2, dextrine 1·7)	70·90
Woody fiber	·11
Ash	·47

Indian Corn.

	Per cent.
Water	17·10
Starch	59·00
Albumen	12·80
Oil	7·00
Dextrine and sugar	1·50
Cellulose	1·50
Ash	1·10

RICE.

	Per cent.
Water	14·41
Nitrogenous substances	6·94
Fat	·51
Starch	77·61
Woody fiber	·08
Ash	·45

BEANS.

	Broad Bean. Per cent.	Kidney Bean. Per cent.
Water	14·34	13·60
Nitrogenous substances	23·66	23·12
Fat	1·63	2·28
Carbo-hydrates	49·25	53·63
Woody fiber	7·47	3·84
Ash	3·15	3·53

THE SIZE OF THE TEETH AS A CHARACTER OF RACE.

UNDER our "Periscope" heading will be found a valuable paper by Dr. William Henry Flower, read before the Anthropological Institute of Great Britain and Ireland, "On the Size of the Teeth as a Character of Race." We are pleased to announce that Dr. J. L. Williams has undertaken the work in this country of measuring the skulls in the Cambridge Museum, the Peabody Museum at New Haven, and the Army Medical Museum at Washington. His examinations and measurements will be based upon Professor Flower's method, but will include observations and deductions of more especial interest to dentists. We expect to publish the results of his researches in the DENTAL COSMOS.

ETHICS OF JOURNALISM.

Our esteemed cotemporary, the *British Journal of Dental Science*, published in eleven issues of that periodical during the past year the translation from the French of Alfred Fournier's lectures on "Syphilitic Teeth," which was made expressly for the DENTAL COSMOS by Dr. J. William White. We have failed to discover a word of credit from first to last to the journal from which it copied. We are sure the omission was unintentional, and that the editor will be glad to give credit where credit is due.

BIBLIOGRAPHICAL.

DENTAL CARIES: A Critical Summary; and the Prevention of Dental Caries. By HENRY SEWILL, M.R.C.S. and L.D.S. London: Baillière, Tindall & Cox, 20 King William street, Strand, 1884.

Under the above title the author publishes in permanent form a series of papers reprinted from the *Journal of the British Dental Association.* It is an effort to show that "caries is a process of disintegration, commencing invariably at the surface, proceeding inwards, and due entirely to external agents. *Enamel and dentine are perfectly passive under this process of disintegration, and manifest neither pathological action nor vital reaction of any kind.*" We have italicized the latter portion of the author's proposition concerning dental caries because his efforts are mainly directed towards establishing this clause, and because of the inevitable futility of any attempt to maintain such a manifestly absurd and impossible hypothesis. While there may be some difference of opinion concerning just what is implied in the use of that somewhat questionable expression, "vital reaction," yet there can be no difference of opinion among those who have had any considerable practical observation regarding the reaction of those organic forces which serve to maintain *all* parts of the body in the condition which we call health. Whether it is possible for a true inflammatory reaction to be exhibited in dentine depends entirely upon the definition of inflammation. If increased or exalted sensibility, appearing in a tissue as the result or sequence of injuries wrought by agencies foreign to the tissue or organ, be accepted as evidence of the existence of an inflammatory condition; if the existence of a well-defined line of demarkation between the external dead layer of dentine in a carious tooth and the more internal healthy tissue, as has been clearly demonstrated by Prof. Mayr and others, in which line or zone there is nearly always much greater sensitiveness than in the healthy dentine beneath it, can be considered as an evidence of inflammatory reaction, then dentine is capable of no insignificant degree of inflammation, and it would seem, to a rational mind, a self-evident proposition, requiring no objective evidence, that any tissue capable of presenting a condition of exalted sensibility is also one in which molecular, and therefore nutritive, changes are possible. But if there are minds incapable of perceiving this truth on *a priori* grounds, it is only necessary to open one's eyes to see abundant and incontrovertible proof of its existence. The author admits that he has made no original research of importance, and that his deductions are based largely on the labors of Tomes and Wedl. But his irrational and radical position is hardly

warranted by the guarded and carefully qualified statements of these authors. I quote from page 413 of Wedl's "Pathology of the Teeth:"

"Since we know that an interchange of material takes place in the dentine and cement during life, as is proved by the occurrence of atrophies, hypertrophies, and new formations, and that the dentine possesses a degree of sensibility, we cannot reject absolutely the idea of a reaction on the part of both hard tissues against the effects of external agents. * * * There can be no doubt that the sensibility, sometimes increasing to actual pain, of the dentine when deprived of its protective covering *is a vital action* [the Italics are ours], and that this becomes diminished when the most sensitive, the peripheral, portion is destroyed by an external agent."

Now, accepting, with our author, Dr. Burdon Sanderson's definition, that "inflammation is the aggregate of those results which manifest themselves in an injured part as the immediate consequences of the injurious action to which it has been exposed," we submit that he is without reasonable excuse for the following utterances:

"Dentine being perfectly passive under every form of injury, * * * must, I repeat, be considered incapable of inflammation—a term which we may now note *includes morbid action of every kind due to injury*" Italics are ours. "We know that dentine violently broken or lacerated does not inflame; we know that a broken exposed surface of dentine, on application of an irritant like solid nitrate of silver, does not inflame; and we know that we may drill a hole into healthy dentine, or expose a surface of healthy dentine after excavating a carious cavity, and forcibly wedge on to that bare surface a foreign metallic mass, a filling, and leave it there, and the dentine will not manifest inflammatory action of any kind." Keeping in mind Dr. Sanderson's definition of inflammation, as given above, we may ask what practical dentist does not know that very decided changes in the dentinal tissue occur beneath fillings? While these changes may sometimes be attributed to the chemical action of the material of which the filling is composed, in very many instances no such explanation is possible. What operator of experience does not know that an inflammatory condition of the dentine sometimes supervenes on grinding the cutting edges of incisors? What operator does not know that the sensitiveness of dentine is often increased by the application of dilute chloride of zinc? Instances of the above character are too common to call for more than a mere reference to them. While it is undoubtedly true that teeth poorly organized in the beginning may never be changed into teeth of faultless structure, yet it is within the limits of indisputable demonstration that such teeth may be vastly improved. This would not be possible

were it not for the fact that there is a constant interchange of material between the tissues of the teeth and the source of their nutritive supply.

If the teeth may be improved in quality by the observance of the laws governing nutrition throughout the entire body, it follows as a logical sequence that they may undergo morbid changes, rendering them less able to resist disease by non-observance of the laws of nutrition. We have observed degeneration of the dental tissues as the result of long-continued, intense mental activity. We may suggest, although probably not without risk of exposing ourselves to the charge, by the author of this work, of being pseudo-scientific, that such degeneration is just what we might expect as the result of a largely increased consumption of the phosphates in the brain. It is also a well established fact that the teeth of women are much more liable to decay, and decay more rapidly, during pregnancy than when the system is not laboring to supply this increased demand.* But the author of this work exhibits such a serene disregard of all the important facts concerning the nutrition of the teeth, that it would hardly be advisable to devote so much space to a review of his work were it not for the fact that it will probably fall into the hands of many students, upon whom its influence will be most pernicious. No dental practitioner can be in the highest degree successful who does not recognize that the teeth are an integral part of the organism, and as such they are subject, within certain limits, to the general laws of nutrition.

It is to be understood that our criticism is specially directed against the author's teaching regarding dentine, although what is true of the vital reaction of dentine is undoubtedly true in a much more limited degree of enamel. We must, however, regard the author's strictures on certain writers, who claim that enamel, in the process of retrograde metamorphosis, breaks down into embryonal or medullary elements, as well founded. From what is now quite clearly established concerning the manner in which enamel is formed, it may be seen that such changes are impossible.

The appearances which have led to these conclusions must have arisen from accidental conditions, or the peculiar chemical treatment to which the specimens were subjected. It is to be regretted, for the honor of the profession in America, that such teaching should have received the recognition which has been accorded it.

The assumption of the author reaches its culmination in his criticism of Dr. Miller, a gentleman who has done more practical

* The author's statement, that the rapid decay of the teeth during pregnancy is to be attributed entirely to a vitiated condition of the secretions of the mouth, is a purely gratuitous assumption.

scientific work in the investigation of the causes of dental caries than all the authorities for whom he professes such a profound respect. The author believes a fine literary style of writing to be the best evidence of high scientific attainment. His own effort furnishes the best possible evidence of the weakness of his position.

The second part of this work, which is a paper on "The Prevention of Caries," read before the British Dental Association at Edinburg last August, contains, beyond a repetition of the objectionable statements already considered, some valuable hints, although these are not specially new nor original. But in recommending the alum and lead mouth-wash, on page 63, the author displays an ignorance of chemistry that would be ludicrous were it not such a severe sarcasm upon the literary-scientific standard which he so strenuously upholds as the measure of the value of a writer's production. He says: "Where powerful astringent effects are desired, no gargle with which I am acquainted is more effectual than the following: Dissolve an ounce of alum and an ounce of acetate of lead in seven ounces of water; filter and add four ounces of orange flower water. A teaspoonful to be added to four ounces of water for use." From a chemical stand-point, alum and acetate of lead are absolute incompatibles, the 4 SO_4 of the alum going to the Pb_4 to form sulphate of lead, which falls in the form of a white precipitate, and which is entirely insoluble in the fluids of the mouth, and is consequently quite inert. In addition to the sulphate of lead, acetate of aluminum and acetate of potassium are formed in the reaction, but to neither can astringent properties be assigned. The entire reaction is shown by the following equation, for which Prof. Henry Leffmann, of the Pennsylvania College of Dental Surgery, is authority:

$$\underbrace{Al_2\ (SO_4)_3 + H_2SO_4}_{\text{Alum.}} + \underbrace{4Pb\ (C_2H_3O_2)_2}_{\text{Acetate of lead.}} =$$

$$\underbrace{Al_2\ (C_2H_3O_2)_6}_{\text{Aluminum acetate.}} + \underbrace{2K\ (C_2H_3O_2)}_{\text{Potassium acetate.}} + \underbrace{4Pb\ SO_4}_{\text{Sulphate of lead.}}$$

The emphatic statements of the author, that little or nothing is to be hoped for in the direction of efforts to improve the quality of the teeth after eruption, cannot be too strongly condemned. Neither can we agree with the author in the statement that hereditary syphilis is to be considered one of the main causes of the increasingly imperfect development of the dental tissues.

On the whole, we cannot regard Mr. Sewill's book as a very valuable addition to the literature of the profession.

J. L. W.

Aide-Mémoire du Chirurgien Dentiste. Publié sous le patronage de l'École Dentaire Libre de Paris. Par MM. Paul Dubois, D.E.D.P., Chef de Clinique à l'École Dentaire de Paris; Drs. A. Aubeau et L. Thomas, Professeurs à l'École Dentaire de Paris. Annuaire pour 1885. Paris: Delahaye et Lecroisnier, 1885.

This little volume comes to us from France, and is, as its name indicates, intended as a manual of reference for the practicing dentist and student. It is published under the patronage of the Dental School of Paris, and has been written and compiled by Drs. Dubois, Aubeau, and Thomas, of that institution. It is issued as an *annual*, with the promise that if it meets with favor it will be enlarged and republished from year to year. It is designed to cover, in a most concise manner, the whole range of dental office practice, and is divided into two parts,—the first relating to the pathology of the oral cavity in all its bearings, proximate and remote; and the second to therapeutics, hygiene, and operative dentistry. The arrangement of the subjects in each part is novel, but has no doubt been adopted for the sake of easy reference.

The subjects are not treated of in their natural or related order, but are arranged alphabetically. We see, for instance, "Dental Caries" quite fully discussed on page 36 *et seq.*, while the subject of "Filling" is not reached until we come to page 285. So, also, "Accidents Attending Extraction" are dwelt upon on page 24, while the subject of "Extraction" proper is treated of on page 260. The subject of "Anesthesia," both local and general, is fully considered, while that part relating to the use and administration of nitrous oxide gas is especially worthy of mention. The chapter on "Pulp-capping" is very conservative in tone and thoroughly *orthodox*, according to prevailing American ideas. The subjects of "Filling" and "Pivoting" are both considered at fair length, while that of "Irregularities" is given but little over a page.

All in all, however, the book is worthy of great praise, combining, as it does, in small compass much practical knowledge, all or nearly all of it in harmony with the accepted teachings of to-day. An additional feature of the work, which will make it all the more acceptable to the French reader and less so to the foreigner, is the large amount of space devoted to the origin, description, and appointments of the French College; a list of its subscribers; a complete directory of the dentists practicing in Paris and certain other French cities; a list of French and foreign dental journals and reviews, besides other statistical matter. The volume closes with a complete index.

S. H. G.

INTESTINAL OBSTRUCTION: Its Varieties, with their Pathology, Diagnosis, and Treatment. (The Jacksonian Prize Essay of the Royal College of Surgeons of England, 1883.) By FREDERICK TREVES, F.R.C.S. With 60 illustrations. 12mo, pp. 515. Philadelphia: Henry C. Lea's Son & Co., 1884. Price, cloth, $2.00.

Mr. Treves here republishes with corrections and additions the essay which last year took the Jacksonian prize of the Royal College of Surgeons of England. The importance of his subject may be estimated by the circumstance that over two thousand individuals die every year in Great Britain alone from various forms of obstruction of the bowels, exclusive of hernia. We are convinced that a similar, or even larger, proportion would be found to prevail here if accurate statistics were obtainable.

Mr. Treves has very ably and systematically discussed the causes, symptons, diagnosis, and treatment of the different forms of intestinal obstruction, from moderate constipation to intussusception or complete strangulation.

His conclusion as to operative interference in cases where life is threatened is one of interest to every practitioner of surgery or medicine, and, having been founded on a study of a large number of cases, is worthy of respectful consideration. He is strongly in favor of the *early* performance of laparotomy by opening the abdomen in the median line, and searching for the seat of strangulation, and believes that in the future, with care, judgment, and through the influence of the antiseptic system, the mortality of the operation should be but little higher than that for the relief of strangulated hernia. The book is not only instructive, but is interesting, and is well worthy careful perusal.

ELEMENTS OF SURGICAL DIAGNOSIS. By A. PEARCE GOULD, M.S., M.B. Lond., F.R.C.S. Eng. 12mo, pp. 584. Philadelphia: Henry C. Lea's Son & Co., 1884. Price, cloth, $2.00.

Mr. Gould's very modest preface scarcely does justice to the excellent little work which he has written for the use of medical students, and which will doubtless prove acceptable to many practitioners of surgery. In clearness and accuracy of statement he has left very little to be desired, and any unfavorable criticism should be directed chiefly to the faults of omission, which are, we think, most noticeable in relation to the mouth and teeth. Only two pages are devoted to the diseases of the mouth, which are consequently not even enumerated at length. We observe the careless statement that "a narrow, highly-arched palate is one of the effects of inherited syphilis," which is certainly attributing an unwarranted diagnostic importance to a very common peculiarity; or the same remark may

be made of the direction to "examine the patient for *other* signs of secondary syphilis, if the soft palate be of a bright red color and the patient experience little or no pain in it." Possibly the most notable omission in this direction is the entire absence of mention of the so-called "Hutchinson teeth," pathological phenomena having a diagnostic value which, in many surgical affections, especially obscure bone lesions and doubtful tumors, is simply inestimable. The book as a whole is, however, one of the best of the useful and practical series to which it belongs, and has evidently been written with care and discrimination.

A Handbook of Ophthalmic Science and Practice. By Henry E. Juler, F.R.C.S., Junior Ophthalmic Surgeon to St. Mary's Hospital, etc. With 125 woodcuts and 27 colored plates. Octavo, pp. 467. Philadelphia: Henry C. Lea's Son & Co., 1884. Price, cloth, $4.50; sheep, $5.50.

This is an American edition of a book which has been for some little time well and favorably known abroad. It has already received the approval of the profession, and in its present shape will doubtless be within reach of many who have been unable to obtain it. Valuable additions have been made by Dr. Charles A. Oliver, of this city,—among them the description of a new astigmatic disk, with an explanation of its use, and important material in the shape of results from his experiments as to the effectiveness of the different mydriatics. The illustrations are among the very best we have ever seen in a work of this character, and add greatly to its value.

Pamphlets Received.

Syllabus of Lectures and Questions on Odontology, Human and Comparative, for the Use of Students in the Dental College of the University of Michigan. By Corydon L. Ford, M.D., D.D.S., professor of anatomy and physiology in the university. Ann Arbor: Register Printing House, 1884.

The Dry Treatment of Chronic Suppurative Inflammation of the Middle Ear. By Charles J. Lundy, A.M., M.D., professor of diseases of the eye, ear, and throat in the Michigan College of Medicine, Detroit. Reprinted from the Transactions of the Michigan State Medical Society; read at its annual meeting, held in Grand Rapids, June 11 and 12, 1884.

Muriate of Cocaïne in Ophthalmic Surgery. By C. J. Lundy, A.M., M.D., professor of diseases of the eye, ear, and throat in Michigan College of Medicine. Reprinted from the November (1884) number of the "Physician and Surgeon," Ann Arbor, Mich.

PUBLISHER'S NOTICE.

THE DENTAL COSMOS FOR 1885.

It is believed that in no other department of human activity is there to be found a greater spirit of research, a keener questioning of authorities, a more generous rivalry for the attainment of the best results, than in the practice of dentistry. Certainly nowhere else is there more inventive faculty displayed, or a larger number of mechanical devices originated for the achievement of the ends aimed at. No practitioner who desires to keep abreast with his confrères can afford to dispense with the periodical literature of his profession. This self-evident truth being granted, the question remains to be decided, which journal will be of greatest value to him.

The Dental Cosmos, to the Twenty-seventh Volume of which, beginning January, 1885, we solicit subscriptions, is offered in the conviction that more nearly than any other it deserves the title of a dental journal. Nothing is admitted to its pages—whether text or advertisement—which does not bear close relation to the theory or practice of dentistry. To its old subscribers it needs no encomium. Those who have not heretofore received it are invited to try it for a year.

Those who wish to subscribe or renew will find a blank form immediately preceding the advertising pages of this number. Subscriptions are required to commence with the January or July number. Price, $2.50 per annum, including postage to the United States and Canada. Subscribers in all other countries will remit the postage, the rate of which to Universal Postal Union countries is 50 cents; to Australia and New Zealand, 96 cents, per annum.

The S. S. White Dental Manufacturing Co.

Philadelphia, January, 1885.

PERISCOPE.

On the Size of the Teeth as a Character of Race.—It has long been known that the teeth of certain races, notably those of the Australians, are of superior size, both actually and in proportion to the general stature of the individual, than are those of other races. It is, however, very desirable that some more exact information on this subject should be obtained, and if possible more numerical relations established, by which the amount of variation in the size of these organs in different races may be formulated and compared.

For this purpose I have availed myself of the very large and varied series of skulls now contained in the Museum of the Royal College of Surgeons, including those of the Barnard-Davis collection, and having measured the greater number of them, beg to submit the results to the Anthropological Institute. Even in so large a collection, numbering over 3,000 specimens, those which can be made use of for this purpose are less numerous than might be supposed at first, in consequence of the numbers—in fact, the great majority being defective in their teeth, either from decay or loss during life, or from their having fallen from the skull after death. Complete sets are extremely rare. The incisors and canines, owing to their simple mode of implantation, are most frequently lost; but the molar series, if complete and sound at the time of death, are in a great many cases preserved. Sufficient numbers for deducing any general observations could, in fact, only be obtained from the latter, and those of the upper jaws alone have been used, because they are more numerous, so many skulls wanting the mandible, and because there is no need to measure both, as the general size of the one is necessarily related to and coincides with that of the other set. I have therefore taken as a test of the size of the teeth the length in a straight line (as measured by the sliding compasses) of the crowns of the five teeth of the upper molar series *in situ* between the anterior surface of the first premolar and the posterior surface of the third molar, which length is designated hereafter as the *dental length* (d).

The absolute length is, however, hardly sufficient for our purpose in comparing races; for the size of the individual, and of the cranium generally, should be taken into account, as smaller races and individuals might naturally be supposed to have smaller teeth. It is therefore necessary to find some standard of length as indicating the general size of the cranium with which to compare the dental length. For this purpose I have selected the cranio-facial axis, or basio-nasal length (BN), the distance between the nasion (naso-frontal suture) and basion (middle of anterior edge of the foramen magnum), as being on the whole the most constant and convenient indication of general size. Even in this measurement there is unfortunately an element of variability introduced independent of the actual size of the skull by the inclusion of the roof of the nasal chamber, and the thickness of the lower border of the frontal bone; but, putting aside occasional individual variations, this is one of the most constant dimensions of the cranium, and if not safe to apply

to a single skull, will, if the averages of a sufficient number of specimens are taken, afford a good standard of comparison.

In the average male skull the length is very nearly 100 millimeters; in the female skull 95. Between the basio-nasal length and the dental length an index can be established on the formula $\frac{d \times 100}{BN}$ =the *dental index.*

The average dental indices of the various races measured appear to vary between 40 and 48, although individuals may be found which either fall below or exceed these numbers. The general average may be taken at 43. Following the convenient method of division adopted with other indices, the dental indices may be divided into three series, called respectively:

Microdont	below 42.
Mesodont	between 42 and 44.
Megadont	above 44.

I may begin, for the sake of comparison, with a study of this character in the anthropoid apes, the results of which are shown in the following table. It will be observed that the dental index is, in all cases, greater in the female than in the male, in consequence of the molar teeth of the former sex more nearly retaining their characteristic size, while the general size of the cranium, as indicated by the basio-nasal length, is diminished. This is very marked in the gorilla, in which animal the disparity between the sizes of the sexes is very great, while in the chimpanzee, the male and female of which scarcely differ, the dental index is also almost alike.

A similar relation of the dental index of the two sexes in the human species is also seen, especially in those races where the disparity of size between the men and women is greatest.

	BN.	*d.*	Index.	Average Index of Both Sexes.
Male gorilla, average of 3	124.0	63.0	50.8	54.1
Female gorilla, average of 3	108.7	63.3	57.3	
Male chimpanzee, average of 3	96.7	46.0	47.6	47.9
Female chimpanzee, average of 3	88.3	42.7	48.1	
Male orang, average of 4	109.2	58.0	53.1	55.2
Female orang, average of 2	90.0	51.5	57.2	
Male siamang, 1	79.0	33.0	41.7	

The first three species are therefore strongly Megadont, while in the siamang the molar teeth are scarcely larger in proportion to the skull than in the higher races of men.

In twenty male British skulls, of which the teeth are sufficiently perfect to allow of measurement, the average BN is exactly 100 millimeters, and the average dental length is 41 millimeters, giving an index of 41; the maximum dental length being 45, the minimum 35; the maximum index 45.2, and the minimum 35.8.

In thirteen female British skulls the average BN length is 95, the average dental length 39.5, giving an average index of 41.6. The maximum length is 43, the minimum 35. The maximum index is 44.9, the minimum 36. The remaining results of the measurements,

which it may be hoped will be extended and corrected by other observers having still more ample material at command, are as follows. It will be observed that the three groups into which the races may be separated by the size of their teeth have a general correspondence with the three principal modifications of the human species: the Microdont section, containing all the so-called Caucasian or white races; the Mesodont, the Mongolian or yellow races; and the Megadont section, being composed exclusively of the black races, including the Australians.

	Sex.	Number of Observations.	Average BN.	Average d.	Average Index.	Average Index of both Sexes.
Microdont Races.						
British	Male.	20	100.0	41.0	41.0	41.3
"	Female.	13	95.0	39.5	41.6	
Mixed Europeans (not British)	Male.	52	101.3	41.0	40.5	41.1
" " "	Female.	14	95.1	39.6	41.6	
Ancient Egyptians	Male.	7	101.4	41.4	40.8	41.0
" "	Female.	8	95.9	39.5	41.2	
Polynesians (mostly Sandwich Islanders)[1]	Male.	22	105.3	42.2	40.1	
Low caste natives of Central and Southern India (mostly males)		42	99.5	41.2	41.4	
Mesodont Races.						
Chinese	Male.	12	98.8	42.1	42.6	
American Indians of all parts	"	31	99.2	42.5	42.8	
Malays of Java, Sumatra, etc.	"	70	99.7	43.2	43.3	
African Negroes of all parts[2]	"	44	103.0	44.5	43.2	43.9
" " " "	Female.	26	97.9	43.6	44.6	
Megadont Races.						
Melanesians (of various islands)	Male.	21	102.3	45.2	44.2	
Andamanese[3]	"	9	94.4	41.9	44.4	45.5
"	Female.	8	88.8	41.2	46.5	
Australians	Male.	22	102.5	45.9	44.8	45.5
"	Female.	14	95.5	44.0	46.1	
Tasmanians	Male.	9	100.0	47.5	47.5	48.1
"	Female.	4	95.5	46.5	48.7	

[1] The teeth are actually larger than in Europeans, but the index is reduced by the great length of the *basis cranii.*

[2] In these again the index is reduced by the great length of the *basis cranii.*

[3] It is the relative, but not the actual, size of the teeth which brings these small people into the Megadont series, among the races to which in many other respects they are allied.

Discussion.—Mr. Hyde Clarke ventured to express a wish that Professor Flower had given the maximum and minimum in each case, as he had simply quoted the averages. An average, he would remark, was not a scientific fact, but rather an amusement of statisticians. In natural science it amounted to the suppression of individuality and thereby of the real elements of description, definition, and classification. The method of their president was a tentative one, but he had great hope that it would afford a convenient medium for the ready determinations of characteristics, as, indeed, the teeth themselves had done in Zoology, and thereby give to anthropo-

logical determinations a definiteness which they had not hitherto obtained. He believed that the very determination of the distinctions and differentiation between male and female dentition might prove ultimately a criterion for determining the influence of mixture on races.

Dr. Walter Coffin begged the privilege of thanking the president, on behalf of the dental profession, for a very suggestive paper on a matter of great interest to them. The measurement which Professor Flower would doubtless find it convenient to call the "mesio-distal molar length" was an important one, and conveniently made upon the living subject, though unfortunately the other factor of the professor's "dental index" must be otherwise inferred during life. Perhaps the most interesting point brought out by the statistics was that the European races were really within one group—the Microdont; this fact bearing upon the theories as to the pathological conditions presented in dental crowding and certain forms of irregularities. It was highly important to know something of the distribution of variations within the range of the groups averaged, and especially of the frequency of *exceptional* ones at the limits.

Mr. Lewis inquired whether the teeth in all races were of the same proportions, or nearly so, as it seemed that the observations of the president were based solely on the space occupied by the three molars in line. He congratulated the president on having taken up a line of investigation which was apparently not only new, but likely to lead to important results.—*William Henry Flower, LL.D., F.R.S., P.Z.S., in The Journal of the Anthropological Institute of Great Britain and Ireland.*

Cocaïne.—The following terse and comprehensive presentation of the history and properties of cocaïne, is made, through circular, by Eisner & Mendelson, importers, Philadelphia:

Wackenroder and Johnson expressed the belief, as long ago as 1853, that an active alkaloid existed in the leaves of erythroxylon coca. Gadeke first isolated it, but it was not until 1860 that Niemann (*Ann. Chem. Pharm.*, 114, 213) announced its physical properties and gave it the name of *cocaïne.* A little later Losson found in coca leaves another apparently inert volatile base, which he called hygrin (*Ann. Chem. Pharm.*, 133, 351). This latter chemist states that in the best leaves the amount of cocaïne was at most one-fifth of one per cent., and in the poorer kinds as little as one-sixtieth of one per cent.

Cocaïne crystallizes in large four to six-sided colorless prisms. It has a bitter taste, benumbing the tongue, a strongly alkaline reaction, and melts at 98° C.; it dissolves in 704 parts of water at 12° C., easily in alcohol, and more easily in ether. Its composition, as determined by Losson, is $C_{17}H_{21}NO_4$. Cocaïne unites easily with dilute acids to form crystallizable salts, which are soluble in alcohol, but not in ether. The salts which the industry of chemists has already prepared are the muriate ($C_{17}H_{21}NO_4HCl$), the sulphate, nitrate, tannate, and oxalate. Beside these, there have been prepared double salts of cocaïne-platinum chloride ($C_{17}H_{21}NO_4HClPtCl_2$) and of cocaïne-gold chloride. By decomposition with strong acids

a new base has been formed of cocaïne, which is called ecgonin. A test given for watery solutions of muriate of cocaïne is picric acid, which throws down yellowish precipitate. The alkaloid cocaïne has not been used medicinally to any great extent, but its physiological action has been studied by a number of observers. For man the dose runs from one-sixth to two grains. Its lethal power is slight and its action is not cumulative (Husemann). Von Anrep found (*Archiv. ges. Physiol.*, 21, 38, 1880) that the cocaïne could be taken daily for a long time without producing any notable disturbance, and he concluded that its action was not cumulative. Schroff, who in 1862 made the first experiments with cocaïne (*Zeitschrift f. Wien Aerzte*, 30–34), found that in large doses it caused vertigo, lassitude, slight deafness, disturbance of memory and of coördination of thought.

Other experiments and observations by Froumüller (*Prag. Vierteljahrsschr.*, 79, 109, 1863), Jarchanoff ("Cocaïne and Diabetes," St. Petersburg, 1872), and Ploss (*Zeitschr. Chir.*, 222, 1863) appear to show that cocaïne is a narcotic, having a primary stimulating action upon the brain, and being analogous in properties to cannabis indica. Froumüller, in fourteen cases, was able to produce sleep by giving large doses (up to five grains). Ploss reports the case of a druggist who took about twenty grains of cocaïne in a glass of beer. He slept quietly for some hours, then awoke with powerful abdominal gripings, burning and dryness in the mouth, and thirst. He vomited any liquid drank. He suffered from vertigo, feebleness, and aneuria for twenty-four hours. The heart's action showed no disturbance, and his mind was not disordered. The case is instructive, as showing that cocaïne is probably not a very poisonous drug to man, and that in large doses its narcotic action is immediate.

Among animals it has been found that frogs are more susceptible than warm-blooded animals, and that the Carnivora are more sensitive than the Herbivora. The fatal dose for a dog is from three to five grains (Danini, "Uber Physiolog. Wirkung and Therap. Anwendung des Cocains," St. Petersburg, 1873). Rabbits are killed by doses of 0.1 gramme per kilogramme of animal, according to Von Anrep.

The physiological effects of cocaïne externally and internally have been studied by the authors already quoted, and by Nikolsky ("Beitrag. zur Cocain Wirkung auf den Thier Organismus," St. Petersburg, 1872); Isaac Ott, Moréno y Mäiz ("Recherches Chim. et Physiol. sur l'Erythroxylon Coca de Pérou et la Cocaïne," Paris, 1868); by Danini ("Ueber Physiol. Wirkung u. ther. Anwendung des Cocains," Charkow, 1873); Bennett ("Report on Antagonism of Drugs," 1875); and by Rossbach (R. and Rothnagel's "Handbook of Therapeutics"). An excellent review of the contributions of these authors, to which we are indebted, is given in Husemann and Hilger's "Die Pflanzenstoffe," Berlin, 1883, from which we summarize the knowledge so far gained of the properties of the drug.

Moréno, in 1868, showed that local injections abolished reflex movements for a time, and Von Anrep, in 1880, showed that the sensibility of the skin was abolished *when hypodermically injected*, and that of the tongue when touched with strong solutions. The same

author applied a solution containing one-half a millogramme to the conjunctiva, and found that it caused a temporary dilatation of the pupil, which was increased by adding atropine. Strangely enough, Anrep did not note that the conjunctiva was insensible, or, if so, did not appreciate the practical significance of the fact. As Nikolsky found that the pupil is still dilated by cocaïne after section of the sympathetic, it is inferred that the drug does not act upon the iris through that nerve.

Cocaïne given internally in small doses to warm-blooded animals stimulates the nerve-centers, acting most plainly upon the higher psycho-motor cells of the brain ; then upon the medulla oblongata and the cord. It seems especially to affect the action of the semicircular canals, causing vertigo, and in dogs, at least, disturbances of equilibrium and rolling movements. The pupil is dilated. A lengthening in the time of muscular contraction, claimed to exist by Ott, Buchheim, and others, is denied by Nikolsky and Anrep. Respiration is hastened and labored in warm-blooded animals ; in fatal doses the breathing stops before the heart action. Upon the heart moderate doses of cocaïne in warm-blooded animals lessen the inhibitory action of the vagus and increase the rapidity of the beat without impairing its strength. Moderate doses appear also to raise arterial pressure, but in medicinal doses the cocaïne does not greatly affect the vaso-motor system. Moderate doses increase intestinal peristalsis, while large doses lessen it and seem to produce a venous congestion of the walls. There is a decrease in the secretion of saliva and of mucus, while the urine does not seem to be much affected, except in toxic doses.

So far as the local anesthetic effect of cocaïne is concerned, it seems to have been independently noticed by several persons, as we have indicated above. The practical application of this knowledge, however, is only of very recent date.

The New Local Anesthetic.—For several weeks past the medical press, including this journal, has teemed with testimony to the wonderful anesthetic effects of the hydrochlorate of cocaïne. Under ordinary circumstances, we should have waited for as many months to elapse before formally granting the truth of such allegations as are commonly put forth in behalf of any new remedy. But, although the available supply of the salt has thus far continued to be exceedingly limited, but a very small quantity has been needed to establish its marvelous power, and that little has been used to good purpose. We have no longer any hesitation, therefore, in proclaiming the announcement of the anesthetic power of cocaïne to be the most important that has been made in therapeutics since Morton astonished the world with his demonstration of the power of ether—the first and still the best of general anesthetics.

Until within the past few weeks, coca had been known and used chiefly—almost exclusively—as a stimulant, and it is therefore not a little remarkable that its alkaloid should suddenly have made a brilliant reputation as a nullifier, for the time being, of the function of sentient nerves. On the other hand, as Dr. Squibb pointedly remarks, in his admirable article on the subject, in the November number of the *Ephemeris*, it is almost as unaccountable that the

full anesthetic power of the drug was not brought to light before, seeing that its dilating effect on the pupil was well known, and that it was even in use to some extent by the laryngologists to benumb the throat so that it would admit of readier manipulation. But this latter consideration should not detract in the least from the credit to be given the medical student. Köller, for his discovery.

Even if it had turned out to be the case, as was at first supposed, that the anesthetic effect was limited to the tissues that had actually imbibed the solution—and therefore to such small areas that the anesthesia would scarcely have been available outside of ophthalmic practice—the great advantage of the agent would have remained unquestioned. That the range of its application would have been thus hampered is not disproved, practically speaking, by even so startling a fact as that laparotomy has been performed with no other anesthesia than that produced by it, for we take it that the performance of abdominal section under local anesthesia is at best but a curiosity, and not at all likely to become a settled practice. What is possible is not always the most desirable, and it seems to us extremely doubtful if surgeons will be willing to dispense with general anesthesia as a rule in major operations. Leaving these out of account, however, there is a wide range of operative procedures in which it is necessary to have a considerable area anesthetized, but in which there is no need of abolishing the patient's consciousness. These cases could not well have been met by a local anesthetic acting merely by imbibition, and it is for that reason that the newly discovered fact that the parts supplied by a sensory nerve may be made insensitive by an injection of cocaïne in the immediate neighborhood of the trunk of that nerve is of an importance that cannot be overestimated. That discovery seems to have been well established by the experiments performed by Dr. Halsted and Dr. Hall, recounted in the latter gentleman's letter, which we publish in another column; and we must not omit to credit Dr. Burke, of South Norwalk, Conn., with having practically hit upon the same idea, as may be gathered from his letter, which we published last week.

No doubt much yet remains to be done in the way of experiment and observation before the precise sphere of the new anesthetic can be defined, and it would be prudent for those who may undertake to furnish us with these data not to count too much upon the innocuousness of the drug, for it should be noted that Dr. Hall experienced marked constitutional symptoms from an injection of thirty-two minims of a four per cent. solution of the hydrochlorate. While caution is to be observed, therefore, the teachings of even our present limited experience with cocaïne ought to go far toward silencing the senseless babble so often indulged in about the uselessness of experimenting with the comparatively unknown substances of the vegetable materia medica. Here was an alkaloid supposed to be well-nigh worthless, but it has suddenly been raised to the first rank.—*Editorial in N. Y. Medical Journal.*

Preparation of Hydrochlorate of Cocaïne.—Recent developments connected with this comparatively new salt have excited much interest in the medical profession. Its peculiar property—

one for many years sought after, yet until recently almost unknown—has been at length found to exist in this alkaloid, obtained from erythroxylon coca, namely, that of producing local anesthesia. By its use the surgeon can, without pain or discomfort to patient, perform an operation which must otherwise cause great agony. It is said, however, that, while there is produced an insensibility to suffering, the sensibility to touch, in the same part, still remains. That such a property should be discovered in a substance so apparently innocent seems truly worthy to be considered a triumph in the chemistry and therapy of the present day.

The formula for its preparation, as given to me by Mr. M. Eisner, which is substantially that of Niemann (see *Amer. Jour. Phar.*, 1861, p. 123), is as follows: Displace coca leaves with dilute alcohol and a small quantity of sulphuric acid. Add calcium hydrate to the percolate, neutralize with sulphuric acid, distill off the alcohol. Dissolve the residue in water, and filter; add soda bicarbonate to the filtered liquid, and wash with ether, adding a small quantity of muriatic acid. The ethereal solution will deposit the hydrochlorate of cocaïne in an amorphous mass, gradually crystallizing. Purify by dissolving in water, precipitating with soda bicarbonate and washing with ether, and leave it to crystallize out of the ethereal solution.—*L. E. Sayre, Ph.G., in American Journal of Pharmacy.*

Civilization and Dental Deterioration.—Those of the inhabitants of the United States who feel an interest in forthcoming generations will read with a sense of instruction a small work on "Dental Caries" just issued by Henry Sewill, a well-known dentist here. It is not so much the pathological relations of the widespread evil, but its casual relations, which will attract their attention. Mr. Sewill holds that as civilization progresses the jaw lessens, and then the teeth are imperfectly developed, and, consequently, from cracks or pits in the enamel of these teeth the immediate causes of caries make their way into the tooth, and so work its ruin. As the teeth of the inhabitants of the United States are notoriously in a bad way, it may be well for those intending to marry to know that "crowding and irregularity of the teeth are mostly caused by smallness and malformation of the maxillæ,—a condition which is, no doubt, largely associated with the physical type presented by highly-civilized man." Consequently, "sexual selection" is a great force in action. "The type of female beauty for many ages has included a small, delicate jaw, the heavy jaw, or anything approaching to prognathism, being universally deemed a disfigurement." However desirable, from the point of view of tooth-development, it might be to select a spouse of the "mickle-mouthed Meg" type, who so exercised the mind of one of the ancestors of Sir Walter Scott, it is scarcely to be expected that a man will marry for the sake of the teeth of his grandchildren. Mr. Sewill, indeed, seems to feel this, for he adds, pathetically, "I am afraid we cannot hope that, for the sake of the teeth of posterity, men will be advised to pick out big-jawed wives; but we can, at least, seriously impress hygienists with the fact that the human jaw, for its due development, needs adequate use, and that no dietary, however otherwise suitable its constituents, can be perfect which is composed of uni-

formly bland and soft substances calling for little or no mastication." And then he falls foul of the French cook, as follows: "The French use their jaws less than any other nation; they are the best cooks in the world, and the whole population, without exception, lives upon the softest food, including bread of the most delicate manufacture."

Having thus laid a ban upon "beauty's bewitchment" with a delicate chin in the choice of a wife, and pointed the finger of scorn at the French cook, it is a relief to find that he feels no animosity or rancor towards the schoolmaster. "It has been plausibly argued that dental deterioration—and especially progressive deterioration—may be accounted for by the overwhelming demands upon the vital powers by the growth of the brain and its increased exercise in modern life. The brain and the jaws are alike fed from the common carotid artery, and it is urged that the demand for blood by the growing and working brain leads to imperfect supply of the masticatory organs. This argument gains support from the fact that the people of the United States, with certainly the worst teeth, present a type of humanity one of whose most striking characteristics is enormous activity of brain and nervous system, with expenditure of vital energy through these channels. But I believe that we shall find this hypothesis will not work, and it remains hypothesis, difficult of negation, impossible of proof." Just think what a long sigh of relief the founders of general education in New England must draw at this expression of opinion,—that is, if disembodied spirits possess inspiration. Perhaps those beings in "astral forms" (*à la* Madame Blavatsky) will kindly convey Mr. Sewill's opinions to the shades of these Puritan worthies as a work of human charity!

In case any spirited American citizen, fired by Mr. Sewill's remarks, wishes to sacrifice himself and his tastes in order to secure a perfect set of teeth for his descendants, the writer could recommend to his attention the "Earthmen" (and women) from the Kalahari Desert, in South Africa, now on show at the Aquarium, Westminster. They are the most complete savages on the globe (unless it be that lowly tribe living in California, the "Digger Indians"); but they present ideally perfect teeth to the eye of the observer,—teeth the enamel of which is perfect, without flaw through which acids and bacteria could penetrate into the interior. How far, however, against this tooth-perfection may weigh sundry drawbacks it is impossible to say. Their women do not seem calculated to form intellectual companions for civilized men; and though the jaws which carry these perfect teeth are not remarkably prognathous, still the face is not attractive, nor its expression very *spirituelle.* If, however, in his new-born enthusiasm he is willing to cast aside everything as compared to dental perfection, he could find a bride to his mind among these human vipers,—for little yellow brutes with poisoned arrows are these "Earthmen."

What Mr. Sewill does regard as a great cause of that imperfect development of enamel which predisposes to caries the reader must seek in the book itself, which is replete with information of much practical value. If the reader is not equal to the self-denial of espousing a big-jawed savage, it may be no breach of confidence to tell him what Mr. Sewill thinks it well to avoid in a wife: "This is the

type most frequently found in females in which there is often, with a fragile form, considerable facial beauty; in which the eyes are large and expressive, the complexion fair, with the blue veins visible beneath the skin. This is the not uncommon type which, without further description, will be recognized, and in which I have invariably found the teeth, although well shaped and often uncommonly white and beautiful to look at, covered with the softest and most defective enamel."

Really, what betwixt Dr. Crichton Browne and Mr. Henry Sewill, —too much education and perverted ideas of beauty,—civilization seems to be progressing too fast for the physique of the future.—*J. Milner Fothergill, in Medical Times.*

The Nutritive Value of Branny Foods.—An important contribution to our knowledge of the value of branny foods is contained in a paper prepared by Drs. N. A. Randolph and A. E. Roussel, and read by the former before the College of Physicians of Philadelphia. Their experiments and observations show that little or nothing that is nutritious is contained in three of the four bran coats of the wheat grain except the salts, and that, when taken as food, they induce a rapid peristalsis, which notably hinders the appropriation by the economy of the nutritious substance of the grain; and, furthermore, that the salts contained in the bran coats are not required nor appropriated, when succulent vegetables are eaten, and that therefore bran bread is not essential in a mixed diet. The nutritive relations of bran food were studied from its exact chemical composition, from the various excretions of the animal upon the diet in question, and from the effects exerted by a given diet upon the growth and nutritive processes of the organism under observation. From the facts presented the authors of the paper consider the following deductions justifiable:

I. The carbo-hydrates of bran are digested by man to but a slight degree.

II. The nutritive salts of the wheat grain are contained chiefly in the bran, and, therefore, when bread is eaten to the exclusion of other foods, the kinds of bread which contain these elements are the more valuable. When, however, as is usually the case, bread issued as an adjunct to other foods which contain the inorganic nutritive elements, a white bread offers, weight for weight, more available food than does one containing bran.

III. That by far the major portion of the gluten of wheat exists in the central four-fifths of the grain, entirely independent of the cells of the fourth bran layer (the so-called "gluten cells"). Further, that the cells last named, even when thoroughly cooked, are little if at all affected by passage through the digestive tract of the healthy adult.

IV. That in an ordinary mixed diet the retention of bran in flour is a false economy, as its presence so quickens peristaltic action as to prevent the complete digestion and absorption, not only of the

proteids present in the branny food, but also of other food-stuffs ingested at the same time; and,

V. That, inasmuch as in the bran of wheat, as ordinarily roughly removed, there is adherent a noteworthy amount of the true gluten of the endosperm, any process which in the production of wheaten flour should remove simply the three cortical protective layers of the grain, would yield a flour at once cheaper and more nutritious than that ordinarily used.—*Medical News.*

Two Cases of Suppuration in Antrum.—Arthur D., aged 4 years, was admitted into the hospital on May 11, 1884.

Personal History.—He had measles in August of last year, and appeared to have made a good recovery. He was now strong and lively, and had not suffered from any other antecedent illness. Two years ago he fell, striking the left cheek sharply against the prominent edge of a fender, causing a deep lacerated wound just below the orbit. This wound healed very well, a doctor's assistance not being required or sought.

Family History.—The child's father, who had had several attacks of rheumatic fever, died of phthisis, at the age of 36. The mother belongs to a "consumptive" family. There have been two other children, one of whom died in this hospital of diphtheria a little while ago. There is no family history of tumors.

Present Illness.—The swelling on the face first appeared about Christmas last. It was bathed with warm water, and gradually increased in size. The swelling was lanced at another hospital some two months later, and subsequently poultices were applied. Since this there has been a constant discharge of pus. This incision is about in the place of the original lacerated wound.

Admission.—The left cheek is found much swollen, the greatest prominence being over the cuspid of the upper jaw; here the skin is stretched, but is freely movable. Just beneath the lower eyelid the skin is reddened and pus exuding. A hard lump is felt over the situation of the cuspid tooth, as large as a cobnut; the surface of the swelling is smooth, and it is rather tender when pressed.

May 15. On exploring the sinus on the cheek with a probe, bare bone is felt; but no opening into the antrum could be found, nor any loose bone; the amount of pus was small. Hot boracic fomentations were ordered.

May 21. Mr. Hill made a free opening into the antrum, over the left cuspid, and found some superficial necrosis of the superior maxilla and malar bones, which he scraped away. The antrum was plugged with boracic lint.

May 24. The cavity was syringed out with carbolic lotion, and iodoform applied to the sinus on the cheek.

May 27. Discharged; well.

Remarks.—In the great majority of cases, abscess of the antrum is produced by dental caries, or by alveolar abscess. But in the present instance we have a case which was apparently due to injury inflicted some two years previously. There was no difficulty in the diagnosis; while the success of the treatment was doubtless due to the free opening which was made.

Thomas N., aged 47, a clerk, was admitted into the hospital under the care of Mr. Godlee. His personal and family history are good. He is of temperate habits, and there is no cancer or tendency to tumors in his family.

Present Illness.—Just before Christmas last year he received a blow from the leg of a couch over the left brow, which made him feel silly for a time. A large lump formed at the seat of injury. This became discolored, and lasted about ten days. A week after the injury, while eating his breakfast one morning, he noticed an offensively smelling discharge from his left nostril. This has continued for some time, and then goes away. He has had severe headache at times, lasting for several days and then going away. This pain begins over the spot where he received the blow; thence shoots up to his occiput. The discharge from the nose comes on after the headache. For three months past he has completely lost the sense of smell.

Present State.—Examined with a speculum, there is seen a yellowish discharge from the floor of the middle fossa of the left side of the nose; the mucous membrane is red and congested.

He was ordered flying blisters over the position of the frontal sinuses, under which there was at first considerable improvement. He was then temporarily discharged.

September 3. On re-admission he still complained of the pain over the left frontal sinus, which extended backwards in a defined manner for about the length and breadth of a forefinger. There was very offensive discharge from his nose.

He was chloroformed, and it was determined to explore the antrum before opening the frontal sinuses, where the mischief was, however, expected to exist. A trocar and canula were passed in above the first molar, and a quantity of creamy offensive pus was evacuated. Mr. Godlee now gouged an aperture through the anterior wall of the antrum, after first separating the gum and mucous membrane from the alveolar border.

The cavity was scraped out with a sharp spoon, and it was plugged with wet boracic lint, dusted with iodoform, after being irrigated with chloride of zinc solution.

September 4. Patient passed a very good night; all pain from the frontal region had disappeared.

September 5. He was discharged greatly relieved.

Remarks by Mr. Godlee.—The interest of this case consisted in the fact that both the history and symptoms appeared clearly to indicate disease of the frontal sinus, whereas there was no swelling, tenderness or discomfort in the region of the antrum. The pain was referred to the inner part of the superciliary eminence, and was thus clearly not due to supra-orbital neuralgia, which not unfrequently accompanies suppuration in the antrum.—*University College Hospital Reports, in Medical Times and Gazette.*

Abscess of the Antrum of Highmore.—Mr. B., 64 years of age, was compelled to have a tooth, the upper last molar of the right side, extracted on account of a severe pain referred to that locality. This operation was performed by a dentist of this city on the 1st of May last. The tooth proved to be sound, and showed no evidence

of any diseased action having existed in it. But the pain had existed in the tooth, as the patient expressed, for eight or nine months, at intervals varying from a few days to several weeks, gradually increasing in its frequency and intensity until it seemed unendurable. The extraction of the tooth was followed by a small flow of pus, which kept up continuously, and prevented a closing of the opening from which the tooth had been withdrawn.

On August 16 the patient presented himself at my office, and, upon examination, I found an opening sufficiently large to admit of the introduction of a probe on the site of the recently extracted tooth. I used a uterine flexible silver probe for the exploration of the diseased territory. On introducing the instrument I found a tortuous canal leading into the antrum of Highmore; not directly through the socket of the tooth, but up around the alveolar process, entering the antrum at its zygomatic surface. This opening was quite small, and the canal leading to it filled with exuberant granulations, so as to impede a free discharge of the purulent formation. Introducing a grooved director, I laid open the soft tissues forming this canal with a blunt-pointed bistoury, and enlarged the opening into the antrum by means of a stout scalpel. This was followed by a free discharge of pus. I next instituted the practice of washing out the antrum with warm water, repeated daily for ten days, at the end of which time the pus formation had about ceased.

On September 3 I again saw the case, and found that the antrum had again assumed its natural condition, and the opening into it was almost entirely healed.—*Frank Warner, M. D., in Cincinnati Lancet and Clinic.*

The Lancet and the Gum-Lancet.—Mr. Edmund Owen says that the great diversity of opinion brought out by the discussion of his paper on lancing the gums alone justified him in having brought the subject before the Medical Society of London.

Happily, I notice that the opinions elicited almost all diverge from that suggested by his paper. Is it a fact that the gums are now rarely lanced?—that the gum-lancet is following the lancet into desuetude? Is there not a danger of consigning to the list of "good remedies out of fashion," enumerated in Dr. Hare's excellent paper (*British Medical Journal*, July 28, 1883), this all-valuable *vade mecum* of the practitioner, in having its utility called in question before a skeptical generation (a generation willing enough, indeed, to "prove all things," but not so ready always "to hold fast to that which is good")? Is it only the family medical attendant, the dispensary or parish medical officer, who sees the cases which the gum-lancet, properly used, instantly relieves and cures? I should have thought no man could be in practice a month without having finally persuaded himself of the value of the gum-lancet. Cannot every practitioner look back on countless cases of convulsions—perhaps of hours' duration—cut short instantly; of intense reflex constitutional disturbance, high temperature, and general febrile condition, great restlessness, great evident pain and distress, perhaps threatened convulsions, at once subsiding on lancing the gums? Why do mothers—multiparæ—call you at all hours, bring their children at all hours in all weathers, with the request that you

should lance their gums,—nay, even provide themselves with gum-lancets, and use them,—but that they know well, by experience, that they have in that operation an unfailing remedy?

No one, I notice, in the discussion that followed this paper, called attention to those cases which, on inspecting the gums, show one or more tooth-sacs distended with fluid, sometimes colorless, sometimes blood-stained, which, on using the lancet, wells out before the gum can bleed; where the lancet comes down upon a tooth that moves under it, and feels as if set upon an elastic cushion.

Dr. de Havilland Hall suggests that "the necessity for using the gum-lancet might generally be obviated by the administration of bromide of potassium." This is the most excellent adjunct in the treatment of such cases, I admit, that I know; but is it not like administering bromide of potassium to relieve a man of the agonies produced by a tight boot? and would not the child frequently die in convulsions whilst the bromide was coming into action? If disappointments occur in cases that should be relieved by the lancet, I submit that its insufficient use is often the cause, the incision failing to completely relieve the tension and free the tooth. After all, is dentition always a simple physiological process? Is there not frequently something pathological about it? The children who cut their teeth "with the large head" are, in my experience, those which specially want help in the process, often getting convulsions with every new tooth or batch of teeth. Again, instead of taking Mr. Owen's caution, to keep a careful lookout for that most insidious of ills—essential paralysis—for which we can do little, would it not be better to look out for, and relieve the brain from, sources of reflex irritation, for which we can do much? To me it is incredible, if other men's experiences be like mine, that, in looking back upon their work, they do not accord their chief and most obvious triumphs to the use of the lancet and the gum-lancet.

The poor lancet has suffered temporary exile from its misuse, but surely the gum-lancet can have little to answer for, even if misused. Both have been in my pocket since the days of my apprenticeship, when they were given me; and, if the use of my head and my hand be vouchsafed to me, they shall remain there till I die.—*H. J. Rope, F.R.C.S., in British Med. Journal.*

Anesthetics and their Administration.—Mr. Woodhouse Braine contributed a paper on the above subject. He began by contrasting the relative merits of the various anesthetic agents now in vogue, saying that we had yet to discover an anesthetic which was absolutely safe; nevertheless, he thought it incumbent upon us to select some agents in preference to others for the reason that they were safer than others. Anesthetics might be divided into two classes: 1. Those which produced death through the lungs as well as through the heart; this class included chloroform, bichloride of methylene, dichloride of ethidene, and many others of the chlorine series 2. Those which produced death through the lungs alone, the heart's action continuing for some time after respiration had quite ceased. This class included ether and nitrous oxide. In the fatal cases under chloroform, death was usually instantaneous in the great majority of cases, and began at the heart; when the heart

once thoroughly stopped, nothing served to ward off death, while, when respiration stopped, even for a minute or two, with artificial respiration there were good chances of recovery * * * Of all anesthetic agents, the quickest and safest, but the most difficult to administer really well, was nitrous oxide. To get its full effect it should be administered pure, all air being rigidly excluded. Deep snoring and an insensitive conjunctiva were the best signs of insensibility. Pregnant and suckling women took gas without any deleterious consequences; children, even those who suffered from chorea, or epilepsy, took it well; great age was no bar, he having given it on one occasion to a woman aged 94. From experiments made on himself, he had learned that just before the loss and the return of consciousness the hearing power was greatly intensified, and he warned surgeons to be careful in their remarks, and advised that the room to be kept as quiet as possible * * * Ether has one great advantage over those anesthetics which depress the heart's action; for the vessels bleed so freely as the operation proceeds that the surgeon is obliged to tie a much larger number; hence there is seldom secondary or even any subsequent hemorrhage to interfere with healing. Chloroform tends to produce syncope; whenever this appeared imminent a few whiffs of nitrite of amyl furnished the quickest means of restoring the heart's action. The anesthetist, besides this drug, ought always to be provided with a pair of tongue-forceps, and the instruments necessary for tracheotomy * * * He summed up his remarks as follows: 1. It was well to avoid all anesthetics which tend to depress the heart's action. 2. For short operations nitrous oxide is the best agent. 3. For longer operations, except where it is desirable to avoid hemorrhage, as in some eye operations, or when the cautery was used, ether answers perfectly. 4. The best time for operating is the early morning. 5. The nasal tubes are of little use. 6. Nitrite of amyl is the best cardiac stimulant.—*Proceedings Medical Society of London, Med. Times*

Affections of the Gum in Relation to other Diseases.—Dr. Kaczorowski (*Przeglad Lekarski*, Nos. 28 and 29, 1884, and *Vratch*, No. 32, 1884) draws attention to a connection existing between gingival affections and certain other diseases. In four of his cases chronic gingivitis caused the occurrence of hallucinations, melancholia, nervous excitement, and insanity. Extraction of destroyed teeth and appropriate treatment of the inflamed foul gums were followed, in each of the cases, by restoration to health of the nervous system. Further, the author saw several instances where affection of the gum led to general septicemia. He thinks generally that premature senile debility of the organism may often depend upon dental caries, leading to absorption into the system of septic products of slow decomposition.—*London Medical Record.*

HINTS AND QUERIES.

To the Editor of the Dental Cosmos:

On the 26th of November I tested the use of hydroclorate of cocaïne in dental operations by hypodermic injections, according to a discovery made by Dr. Richard

J. Hall, of Roosevelt Hospital, and at his suggestion, as he was about to have me operate upon an extremely sensitive central incisor. I injected eight minims of a four per cent. solution, as nearly as possible in the infra-orbital foramen,—reached through the mucous membrane of the mouth,—and in about two minutes there was complete anesthesia of the left half of the upper lip and cheek on both the skin and mucous surfaces; also of a portion of the nose, and the left side of the lower border of the gums, from the median line beyond the bicuspids. I inserted a gum wedge very firmly, causing no pain, and excavated and filled the tooth without giving Dr. Hall a sensation of pain, although before the injection the tooth was exquisitively sensitive. To use the words of Dr. Hall, which I quote from the *New York Medical Journal*, of December 6, "piercing the mucous membrane with the needle caused pain like the prick of a pin, but its subsequent introduction until it struck the bone and the injection of the solution were not felt."

I have followed up this experiment with a number of others, having more or less success in all of them, particularly with the lower teeth, as I have repeatedly anesthetized all of the teeth on one or the other side of the jaw, by an injection of eight drops into the inferior dental nerve at the point of its entrance into the ramus of the jaw. We can affect the anterior superior dental nerve by injection at the infra-orbital foramen, and so anesthetize the centrals, cuspid, and bicuspids. I have not yet ascertained what can be done with the superior molars, whose more direct nerve communication is so imbedded in the superior maxillary bone, but, from an experiment made by my brother Spencer, I believe an injection near the roots of those teeth would be efficacious.

Cocaïne is apparently a powerful agent, and that suggests caution in its use, as some people would be able to endure much more of it than others. I should not look for harm from an injection of sixteen drops of a four per cent. solution, though, in any case.—Charles A. Nash.

To the Editor of the Dental Cosmos:

Dr. J. Morgan Howe, in the December number of the Dental Cosmos, writing of the hydrochlorate of cocaïne, says that after about two weeks a fungous growth appeared in the solution, which as time passed seemed to destroy the efficacy of the drug. I would suggest for the prevention of this growth the use of the oil of cloves, in the following manner: Add to one drop of the oil of cloves four drops of alcohol; let this stand a few hours, and then put one drop of the preparation to each ounce of the solution of cocaïne.—W. G. Foster, *Baltimore, Md.*

A Lathe "Drip."—Having tried several appliances for keeping corundrum wheels wet, all of which were more or less annoying, I hit upon the following plan, which may be of service to others: Take a Squibb ether-can (there are usually plenty of them lying about the office), and solder to it, near the bottom, a tin tube, about one-quarter of an inch in diameter. Then perforate the can through the tube with an old excavator, pointed so as to make a hole about the size of a pin. Fill the tube lightly with absorbent cotton or sponge, allowing it to protrude so as to rub against the stone; then fill the can with water and cork it with a good, soft cork, and it is complete. When it is tightly corked there will be no flow; loosen the cork, and the water will flow, much or little, as you desire. Mine works very nicely, and is always ready for use. Of course, the appliance should have legs to raise it to the proper height.—A. Morsman.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

A REVIEW OF NEW THEORIES.

BY T. DWIGHT INGERSOLL, ERIE, PA.

A REPRINT from the Transactions of the Illinois State Dental Society for 1884 contains two articles contributed by prominent men of the dental profession who are opposed to the generally accepted theory that defective enamel of the teeth is the result of constitutional disturbances. Professor W. H. Eames, author of the first article, says:

"It is not due to constitutional disturbances affecting the epithelial structures, such as measles, eruptive fevers, mercury, syphilis, eclampsia, etc., which are supposed to cause an arrest of development and a consequent defective enamel structure, but to a blight or death of the ameloblast, or, in cases of fissures, a 'rupture,' being the result of a separation of the ameloblastic layer."

It would seem from the above that heredity, evolutionary processes, or something else is back of all opposing influences and diseases which act upon the protoplasmic matter that is to become part of the enamel organ, causing blight or death. As the matter in that organ is *living* matter, it is, of course, subject to death, but what causes the death of one or more living cells Professor Eames does not satisfactorily make evident when he tells us that "the succession of furrows observed may be accounted for by assuming that there is a period of rest for the incoming tooth; the cells (absorbent cells), acting upon the enamel when the tooth is at a period of rest, form a furrow or groove across the surface. When the period of growth sets in the tooth shoots onward, and a portion of unaffected enamel passes beyond the reach of their influence, forming a ridge; again a period of rest sets in, and again the cells act upon the enamel brought in immediate contact, and another furrow is formed. Thus, any number of furrows and ridges are

formed, dependent upon the continuance of the abnormal action of these cells. As this action is due to systemic conditions, all teeth in contact with the organ at the time are alike acted upon; hence the relative position of the markings on the incisors and canine teeth."

I am inclined to think that the normal action of the absorbents never produces unsightly marks and grooves on enamel of the permanent set of teeth. I have, however, seen the enamel discolored and somewhat disintegrated on emerging from the gum after the removal of roots of the deciduous teeth, but I attributed this to ulceration, and not to the action of absorbents, whose function is not to attack the hard, or even soft, tissues without just cause. There can be no good cause for destruction of the enamel, while their action in removing roots of the first to make room for the second set is reasonable and according to a law of the organism, resulting in a change in the dental apparatus of the child to that of the man, which is as great a necessity for the perfection of the adult as the metamorphosis of the larva in the chrysalis state for the perfection of the imago, or the tadpole for that of the frog.

But we are told that it is the abnormal—not normal—action of the absorbents that does the mischief, "the cells acting upon the enamel when the tooth is at a period of rest." Professor Eames also says that abnormal action of absorbents "is due to systemic conditions." He certainly did not refer to measles, eruptive fevers, eclampsia, or any similar condition, for that would have landed him squarely on the old theory. What these systemic conditions are we are not informed. If he had in mind healthy conditions, the wonder is the greater, for it is hard to get a conception of a being having healthy organs, one of which preys upon some other organ.

Let us imagine that the assumed habit of alternation of action of the enamel organ be transferred to the absorbent organ. The latter would then act normally upon the roots of the outgoing teeth for a period, and then act *ab*-normally upon the incoming set for another period, grooving the enamel. This would be followed by a period of rest, and a ridge of enamel would be formed before abnormal action again took place, and thus furrow after furrow and ridge after ridge would, most mysteriously, come into view. This supposition, however absurd it may seem to be, would, without doubt, as readily be received by that class of dentists and physicians who have an idea that there is connected with the most mysterious phenomena of life something of a supernatural character. When such persevering searchers after hidden causes discover vitality, an unfathomable mystery, or anything that appears to be supernatural, all investigation comes suddenly to an end.

If, now, the absorbents take on abnormal action just long enough to plow a furrow, and then come to a state of rest during the formation of an enamel ridge, the work of marring the tooth must be guided by a little intangible deity residing within the dental apparatus. Perhaps this view of the mystery is objectionable. We then have no other recourse left us but to fall upon states and conditions of the system for an explanation; for Professor Eames tells us that the abnormal action "is due to systemic conditions," and that drives us to the discouraging conclusion that the profession is no wiser for the theory.

The second essay referred to at the beginning of this article was written by my brother, Professor L. C. Ingersoll, of Keokuk, Iowa, dean of the Dental Department of the Iowa State University. He joins hands with Professor W. H. Eames,—not in his theory, however, but in opposing the old theory, hoping thereby to establish one of his own, which in his judgment "will sufficiently account for all observed cases." My brother having consented to the publication of my views on the stand he has taken, I herewith present them in connection with some remarks on Professor Eames's theory, having the kindest feeling toward both these gentlemen.

After treating in a light manner the arguments that have been urged in favor of the old theory, by comparing the grooves and ridges on the teeth with the imbricated order of ridges in a cow's horn, the rings and constrictions in the barrel of a goose quill, and other similar examples that have been published from time to time by unthoughtful dentists, Professor Ingersoll says:

"Now, if it is possible for you to disabuse your minds of so erroneous a theory, after cherishing it long, you will be prepared to consider another theory, and to mark its coincidence with well-known facts. The statement of the new theory is this: that these markings do not occur during the follicular development, but are the result of chemical action occuring after the development of the crown, and after its emergence through the gum. The fact of the erosion of the enamel at the margin of the gum, in the form of a groove, is one of universal observation. It may be considered an accepted fact that a horizontal groove or line may thus be produced along the labial or buccal face of a tooth, and also, as sometimes seen, on the lingual faces. This dissolving of enamel in a horizontal line, at the margin of the gum, may occur at any period during the emergence of the crown—at the time when the point of a cuspid has just made its appearance, or when half the crown is seen. In the latter case the marking will appear on the fully developed tooth, midway between the point of the cusp and the margin of the gum."

The statement that these markings are "the result of chemical

action occurring after the development of the crown, and after its emergence through the gum," is a very bold one, which may be true in regard to some of the grooves, but I cannot concede its general application. Grooves and ridges in enamel and lines of pits are almost always horizontal, and of course are not parallel with the festooned margin of the gum. They are also very narrow; and how chemical action could be confined to a straight line across the face of a tooth long enough to cut a groove in the enamel is past my comprehension. To keep the solvent at work in a horizontal line no wider than the groove it is to form, against a constant change of saliva and the action of the lips and tongue, the friction of food and anything the child pleases to put into the mouth,—it is simply impossible.

Professor Ingersoll says there is a "physiological law that governs both plant and animal development, and that is the law of alternate vital action; in other words, that active development alternates with arrested development." As this is not proved to be a fact respecting the teeth, it may for the present be regarded as a supposition. Because arrested development is sometimes noticed in the top branches of a tree (a maple tree was cited), it does not follow that the teeth are thus effected. A phenomenon of that character in the animal or vegetable kingdom, to become a law, must be of constant recurrence; the tree must show an annual arrested growth of foliage; it must be apparent to all by grooves or some other signs that teeth, *generally*, are periodically arrested in development. Law implies habit; but the constancy of alternate periods of action and rest for the dental organs has not been proved; neither has it been proved that there is a dangerous "acrid fluid developed at the margin of the gum, which, in a nascent state, is an active solvent of enamel," *except* in times of constitutional disturbance. If this be true, the theory is brought face to face with a difficulty. The mischievous acid being present only in times of constitutional disturbance, the old theory would account for the grooves and ridges; but if it is said that the acid may be present at all times, that would prove that all teeth would be thus affected. The fact is, we know too little about the phenomenon. It is feared that the tap-root has not been reached, and we must cut away the surface roots and dig deeper. It may be that the tap-root reaches down to a current that brings sustenance from a distant fountain. Defective enamel may be attributed to several causes, some of them being the same as those that produce general decay. We have been too much in the habit of fixing our attention on one or two immediate causes, instead of searching for those that may be hidden and remote. We ought, perhaps, to go back to the beginning of history

and into prehistoric time, tens of thousands of years, when the first human beings came into existence. We may suppose that primitive man was provided with a perfect denture; and if we could follow his descendants as they passed from the wild troglodytic state of life through the various phases of civilization down to our time, we would, doubtless, be able to increase the list of causes that have brought upon this generation not only imperfect enamel, but a widespread destruction of teeth.

The theories under consideration are of considerable interest, and I wish to thank the authors for their publication, hoping they will be the means of a more thorough examination of the causes that effect not only the teeth, but the general health. The difference between the two theories is principally in the employment of different agents to do the same suicidal work. They impress the mind with the idea that nature has not entirely rid herself of various spiritual existences with which she seems to have been endowed by heathen philosophers; she seems still to retain a hold on that little deity, vitality, and is now toying with another that is able to build up or tear down living human tissue at will by an easy transition from a normal to an abnormal state.

"When we know as little as we do," says Virchow, "we ought to be very modest in our theories."

THE USE OF THE KEY.

BY THOMAS FILLEBROWN, M.D., D.M.D.,

PROFESSOR OF OPERATIVE DENTISTRY IN HARVARD UNIVERSITY.

(Read before the American Academy of Dental Science, Boston, Mass., January 7, 1885.)

UNTIL about 1830 the key was the main reliance for extracting teeth. At that time the forceps had been so well perfected that it very soon almost entirely superseded all other instruments for this purpose. Since that time the key as an extracting instrument has been held in disfavor by the profession and by the public as well.

Almost every writer on extracting teeth has taken pains to pointedly and emphatically condemn it, and to warn his readers against the use of it. Desirabode calls it a "dangerous implement, fit only to mask the unskillfulness of the operator." Robertson names it "an instrument of torture and of dread. The key in any form is a powerful instrument, but at the best a dangerous and barbarous one." Taft calls it "a very imperfect instrument. With it the liability to accident is greater than with any other instrument. The force is applied at too great an angle with the axis of the tooth, and hence in numerous instances it is broken off. The bolster of the

key rests on the gum, which it always bruises and frequently lacerates in a cruel manner."

This is a fearful indictment, and if true eternal obloquy should be its fate. But it is not true, and comes from an entire misapprehension of the capabilities of the instrument, and of judging it by results obtained from application to teeth for which it is entirely unsuited, and charging the instrument as guilty of all the ill results of such misuse, and also considering it responsible for all the injury done by it in the hands of unskilled persons, professional and non-professional. Such treatment is unreasonable and unfair, and has prevented its invaluable qualities being appreciated.

A careful observation and study of the instrument will discover its limitations, remove the haze of misapprehension which has so long surrounded it, and show the groundlessness of the abuse it has suffered. There have been exceptions to this rule of condemnation, and with some the key has found favor, and held its place among the extracting instruments of a number of our most successful operators. When I commenced practice I as fully as any one believed the key was an instrument fit only to have a place in a museum, to be viewed as a relic of a barbarous age, and the fact that a tooth could be easily and successfully extracted with it was as far from my apprehension as a conception of the telephone. But full as I was of prejudice as well as conceit, I was amenable to the logic of a demonstration, and after witnessing a few operations by my partner, Dr. D. B. Strout, with whom I was associated for several years, I was entirely converted, and have never had a symptom of backsliding. Nearly forty years ago Dr. Strout was a pupil with Dr. J. A. Young, of Portland, Me., in whose hands the key was a great success, and by him was instructed in its use. Dr. Young in turn was taught by a dentist in Baltimore, with whom he studied years before. Thus, it will be seen that I am following a direct unbroken line of practice that reaches back to the time when the forceps was scarcely known, and the key was the instrument in general use. So I may reasonably consider myself in the line of true "apostolic succession." In the hands of those operators the use of the key was confined mostly to the conditions and cases which I describe.

The key is suited to the extraction of the eight bicuspids and roots, and will do it more readily, easily, quickly, and successfully than any other instrument ever invented. It is equally applicable to a single root of an under molar, where the buccal portion is firm, even if it does not protrude above the gum or alveolar border; and in cases where the lingual side is much broken down, its superiority over the forceps is particularly manifest, as well as on the bicuspids. I consider it an entirely unfit instrument with which to

extract either the incisors or cuspids. While some operators extract molars with it successfully, in my hands it is less desirable for them than well-constructed forceps, except occasionally for an inferior third molar, which it will extract with great ease when the conditions are favorable. I have never met an operator who could use the key intelligently, and with a fair degree of skill, who failed to find it invaluable.

The construction of the instrument is of importance. Poor keys are as useless as poorly constructed forceps, and proportionally plentiful. I prefer the bent shaft, as it is more readily kept clear of the front teeth. The fulcrum should be neither too large nor too small. Three-fourths of an inch in length from center of shaft to extremity of face, and one-half an inch in thickness, has in my hands proved desirable. The hook must be long enough and well curved, so as not to be thrown off by contact with the crown of the tooth when force is applied by turning the shaft to extract it. With the fulcrum and hook properly formed, and their relations properly established and skilfully used, the key is the least likely of any instrument in use to lose its hold or to break the tooth. As usually made, the hooks have two points for bicuspids and three for molars. It was such as these I was taught to use. But by a peculiar placing of the instrument, not easily described, all the work was done with one point of the hook, the others being carried free from the gum and tooth, and thus ignored. Some fourteen years ago I learned of some one, I think, in Philadelphia using a hook with one sharp point only. I immediately made one by grinding off the two outer points from a three-pointed hook, and making the remaining point sharp. This form proved a great improvement, and I consider it perfect, and am now using it.

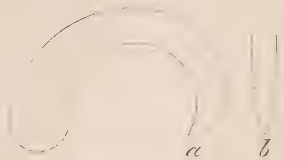
Fig. 1 shows a properly constructed hook. When used the bulb of the key should be covered with a pad. The use of it without is likely to bruise the gum. A permanent pad of any kind I dislike, as it becomes foul in spite of care. A little wet cotton, wound around and tied with a small string, answers an excellent purpose. If one is skilled in its use, no tying will be needed. The old-fashioned, untwisted lamp-wicking, or a small napkin, answers well.

Fig. 2 shows the fulcrum and hook, properly constructed. When padded, place the fulcrum on the inside of the jaw, opposite the tooth to be extracted, and rest it on the edge of the gum, well up on the neck of the tooth. If placed low down the lateral force is increased and exerted on the alveolus instead of the tooth, and fracture is the result. If the tooth be strong, place the point of the hook on the neck of the outside of the tooth, pressing down the gum a little, but not sufficient to wound it. When adjusted as in Fig. 3, turn the

instrument inward, gently, until you feel that the hook is fixed, when a quick, resolute turn of the hand will extract the tooth instantly, and in almost every case to the great surprise of the patient that it hurt so little.

The "putting on" of the instrument gives no pain whatever. The

Fig. 1.



a, side view; *b*, edge view.

Fig. 2.

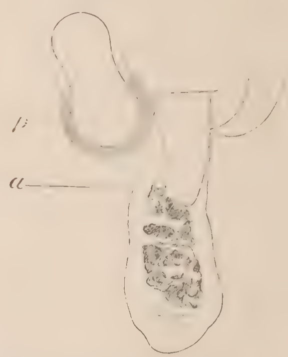
Key, actual size.

pain is confined simply to the separation of the connections of the tooth with the walls of the socket. There is no painful pushing or crushing of the gum, as with the forceps. If the crown be gone, and the root is fractured or decayed below the margin of the gum,

Fig. 3.

Transverse section of under jaw, right side, through first bicuspid, with key adjusted for extraction; actual size. *a*, lingual surface; *j*, body of jaw; *c*, cancellated tissue; *s*, shaft of key; *p*, pad on fulcrum.

Fig. 4.



Showing adjustment to root. *p*, pad; *a*, lingual surface.

the fulcrum must be put a little further on the jaw, and the hook placed well down on the gum, even one-third of an inch from the margin, as in Fig. 4. Then apply force by turning, as before, and the hook will penetrate the gum and alveolar wall, and catch the

root, as in the former case. It will make a clean cut through the membranes to the edge, without lacerating the one or fracturing the other, and remove the offending root with the most surprising ease and facility. The fulcrum, in any case of proper use, will not bruise the gum even enough to cause ecchymosis. No one who has not observed the operation of the instrument under these circumstances can at all appreciate the excellence of its performance, and, I think, no one who has witnessed it and mastered its use would fail to be enamored of it or ever be without a key in his operating case.

The great adaptability of the instrument is shown by the variety of ways in which it is used. While a pad is generally recommended, many do not use it. Dr. Mead, of Providence, uses a key with a large, rounded fulcrum, without any pad whatever, and causes no bruising of the gum. He finds the key particularly applicable to the molars, and seldom uses it for bicuspids. He always places the fulcrum on the inside, and turns the tooth inward. Dr. Preston, of Boston, has used the key successfully for more than forty years, and thinks it invaluable. He applies it to both molars and bicuspids, and occasionally to under incisors. He uses a very large pad, made by winding a napkin around the bulb, and always places the fulcrum on the outside of the jaw, turning the tooth outward, and often, when applying the key to third molars, arranges the hook by a screw on the shaft beyond the fulcrum so as to reach back farther than the fulcrum can be placed. He thinks the injuries done by the key have been caused by placing the fulcrum on the inside, and allowing it to slip down too low on the gum,—which danger is avoided by placing the fulcrum outside.

As a *dernier ressort*, when the alveolus must be cut through, perhaps, on one or both sides nearly or quite to the apex of the root, and the pain inflicted is no longer in question, recourse must be had to the forceps, for such cases are beyond the capabilities of the key, as also are cases of much crowded or misplaced teeth.

Much philosophy has been expended to show that the angle at which the force is applied is such as to endanger the tooth and alveolar walls, and that an excessive amount of force is needed to perform the operation. My own experience is so opposite to this, that it sounds to me like the reasoning of a theorist who has had no practical knowledge of the subject under consideration, but who has taken the results of unskillful misapplication and the bungling mistakes of blacksmiths for proper use, and thus, in some sense, legitimately arrived at such mistaken conclusions. The natural inclination inward of the bicuspids (see Fig. 3); the taper of the root toward the apex; the extreme thinness of the outer wall of bone, and the substantial thickness of the inner plate, render the direction

of the force exerted by the key extremely favorable. The major part is in a direct line with the axis of the tooth. The first application is perhaps a little lateral in direction, as is required for the surest and easiest starting of the tooth from the socket. We are taught, when using forceps, to thoroughly loosen the tooth and break up its connection with the jaw by lateral force, before attempting to remove it from the socket. This is good practice, and it is equally good for the key. Continued use for more than twenty years has demonstrated to me that the direction in which the force is applied in the extraction of bicuspids is especially favorable and effective, and the amount of strength required on the part of the operator to perform the operation is surprisingly less than is needed for the use of the forceps in similar cases.

A spicula root forceps would not be expected to extract a molar as successfully as one well constructed purposely for it. Neither should the key be condemned for not performing perfectly well the work of another instrument. I believe the key to be a most excellent and perfect instrument for its work, and I ask a reconsideration of its merits by scientific operators throughout the profession.

GOLD CROWNS.

BY C. S. CASE, D.D.S., M.D., JACKSON, MICH.

At the meeting of the Michigan State Dental Association in 1882 I attempted to explain a method I had long employed of making and adjusting the so-called "gold crown," a method that I believe will enable the dentist to do this work in less time, with greater accuracy, and more artistic results than can be obtained by the Richmond method, which is still employed by a majority of the dental profession.

The plan I shall explain requires so little time comparatively at the chair, that it will recommend itself to those operators whose time is valuable, because it admits of leaving most of the work to a skilled assistant, or the doing of it by the dentist in the evening.

The mechanical preparation of the root should be the same, in my opinion, as for any crown (excepting the Büttner) that is intended for a ferrule to telescope over it,—i. e., after the gum has been separated from its attachments to the root, all that portion which is intended to be received within the ferrule should be made in the form of a straight tenon, having parallel sides. For that purpose I use a short, sharp, sickle-shaped scaler, drawn so as to take an oblique direction along the side of the root.

The importance of entirely removing the dovetailed shape of the

root cannot be overrated, and I think the neglect of it is one of the principal causes of failure, for, if the crown is made to pass over the enlarged end, it must needs leave a space beyond, between it and the root, that is difficult if not impossible to close by the most thorough burnishing. This space soon fills with decomposed blood, serum, and broken-down tissue, causing subsequent disease, which must proportionately impair the perfection of the operation. It is not necessary to shape the end of the root flush with the margin of the gum, as is commonly the practice, in order to remove as far as possible the enlargement of the natural crown, because all that can be left gives additional strength to the new crown, and is often sufficient without the aid of screws or other appliances. It is not a difficult matter to remove the enamel and a peripheral portion of the dentine, with sharp sickles, side-cutting hoes, and disks. In fact, it is not an uncommon practice with me (and doubtless with others) to telescope a hollow gold crown over a tooth that has become too much disintegrated to fill, but still has a normal pulp.

After the root has been prepared, I prefer to obtain not only a measurement—the usual method—but an *exact pattern* of it, and

Fig. 1.

Fig. 2.

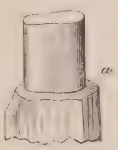


Fig. 3.

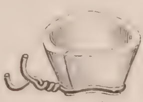
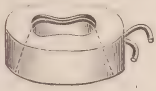


Fig. 4.



dismiss the patient to continue the work at my leisure in the laboratory; so that at the next sitting I shall have a tube that will *at once* pass over the root, and *fit into all its irregularities*, with no need for alteration.

Around the prepared root pass a piece of fine, soft, or annealed wire. Surgeons' silver suture wire is best, because it retains whatever shape is given it without the slightest recoil. Carry the loop beneath the margin of the gum, on the palatal or lingual side, with a pair of gold carriers, the same as you would a silk ligature when putting on the rubber-dam. Now twist the ends together on the labial side with a pair of pliers, and burnish the wire into conformity with the irregularities of the root. Before removing the loop it should be so marked that it will indicate the relative position it took in the mouth. This can best be done by turning up the free ends of the wire, as shown in Figure 1. Then its removal from the root should be accomplished with the greatest possible care, so as not to disturb its peculiar shape. If this cannot be done with comparative ease, it will indicate an enlargement at the base of the root,

that must be removed before proceeding further. Having obtained a perfect pattern of the root (see Fig. 1), I dismiss the patient; and when opportunity offers I cut a form on the end of a piece of hickory, that will pass through the wire loop so as to exactly touch its inside circumference, and yet not disturb its original shape (see Fig. 2). To guard against this the following plan has been suggested: Warm a strip of base-plate wax; place it within the wire loop, and with a hot wax-knife cover the inner half of the wire (see Fig. 3),

FIG. 5.

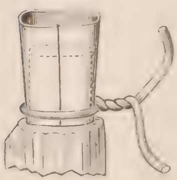


FIG. 6.

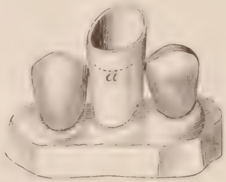
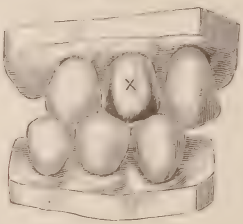


FIG. 7.



and then invest in plaster, which, when hard and the wax is removed, is to be trimmed top and bottom flaring from the loop, as shown in Fig. 4. This will facilitate the shaping of the hickory form and prevent disturbance of the guide-loop, which should always be, as shown in the cut, near the bottom or cervical aspect of the plaster shell. In my practice I have not found this necessary, as I can shape the wooden form as soon as I could make the matrix, and preserve the shape of a loop of large or medium-sized silver suture

FIG. 8.

FIG. 9.

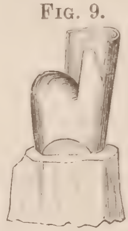
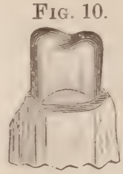


FIG. 10.



wire with little difficulty. I hold the loop carefully against the stick, and with a sharp pencil outline its inside circumference. I then cut rapidly down to this with a coarse file, and finish with a fine one, being careful whenever the loop is tried to use no force.

A strip of gold plate should now be cut long enough to reach around the form, and wider than the length of the desired crown; the approximating edges bevelled and drawn together by a loop of annealed iron wire (see Fig. 5); then removed from the form and soldered. If it is desired that the body of the crown shall be larger

than at the cervical portion, the strip of gold plate should be cut crowning, so that when passed around the form it will flare from it, touching only at the part that is intended to fit the root. After soldering, the ferrule should be again returned to the form and more perfectly fitted, and the edge that is to pass beneath the gum made thin, polished, and shaped so as to conform to the shape of the border of the alveolus. If the work has been done carefully, this ferrule will telescope perfectly over the root. It should now be forced to the position it is intended to occupy when finished, and an impression taken in plaster of it and the adjoining teeth. If the ferrule does not come away with the plaster, remove it from the root, and place in position in the impression. Before dismissing the patient for the second time, secure a perfect "bite" of the place in wax.

A model in plaster from the impression obtained will show the ferrule in the same relative position it occupied in the mouth. Draw a line across it even with the cusps of the adjoining teeth (see *a*, Fig. 6); remove from the model, adjust the wax "bite," and make a plaster articulation. By the aid of this, make a model of the crown in wax, or modelling compound (see *x*, Fig. 7), to be used as a guide in shaping cusps upon the end of the wooden form (see Fig. 8). After which the shoulder should be filed back, so that the ferrule when adjusted to the form will stop at a place that will give the proper length to the crown, when the free end of the ferrule is turned down to form the cusps, as will be described. The guide to this will be the mark that has been made upon the ferrule, before removing it from the plaster model, to be governed *always* by the wax model of the crown. That is, the articulating teeth may strike into the space in such a way as to preclude making the buccal cusps even with those of the adjoining teeth. In forming the cusps, cut V-shaped pieces from the projecting end of the ferrule, and turn down one lap at a time, fitting the edges in turn with hammer and file (see Fig. 9).

To facilitate soldering, a thin piece of platinum can be easily fitted over the wooden cusps within the crown, and the whole invested in plaster and asbestos, so that the platinum lining is crowded to place, and only that portion of the crown exposed that is to be soldered. After soldering, replace the crown upon the plaster model, and correct any deviation from a perfect articulation. Finish and polish upon the wooden form (see Fig. 10). When this is inserted upon the root in the mouth, I think one can reasonably expect that no other change will be necessary.

Before final adjustment, a small hole should be drilled through the articulating portion of the crown, for the escape of surplus cement;

the hole to be subsequently filled with gold foil. With the root already in a healthy condition, one has occupied at the chair not more than two hours of time, as follows:—one hour at the first sitting, to prepare root and obtain pattern; one-half hour at the second sitting, to adjust the ferrule and take the impression and "bite;" and one-half hour at the third sitting, to adjust the crown; and this is made possible by the fact that everything has been fitted outside the mouth.

THE PRACTICAL USE OF COCAÏNE CHLORIDE IN DENTAL SURGERY.

BY J. P. CARMICHAEL, D.D.S., MILWAUKEE, WIS.

There has been of late a great deal of interest manifested in the application and effect of cocaïne in minor surgery. No sooner were its anesthetic properties known to the medical world, and its physiological action to a certain degree established, than its employment in dental surgery began to engage the time and attention of dentists, many of whom, in their zealous endeavors to obtund pain in sensitive dentine, entirely overlooked the physiological effect and natural properties of the drug, which had already been demonstrated by its action on the eye and throat.

The most satisfactory results are obtained by its application to moderately vascular tissue, or at least to such as is susceptible of easy penetration,—its action having a tendency to render the parts anemic, thereby indicating that a fairly active circulation is necessary for the attainment of its highest anesthetic effect.

It thus becomes apparent to the most casual observer that no immediate results may be expected from its use alone on so non-vascular and dense a structure as the dentine of a tooth, to which nearly all dentists seem to have directed its application, rather than to the structure most susceptible to its influence, the gum and connective tissue, the seat, it can safely be asserted, of three-fourths of the pain experienced in dental operations. Therefore, we need not expect, for the present, any marked results towards the alleviation of pain from the use of cocaïne upon sensitive dentine, unless it can be combined with some drug of more actively penetrating qualities. In this connection may be mentioned a number of minor but painful operations, hardly noticeable to the operator, but sources of great pain and irritation to the patient, rendering long sittings exhausting, from the effects of which it sometimes takes days for a highly sensitive lady or child to recover. Among others may be cited the tying of a ligature about the neck of a tooth, to support the rubber-dam, which in many instances causes more pain than the

preparing of the cavity for filling. Especially is this true where it becomes necessary to press upon a very sensitive and swollen gum to reach the cervical border of a deep-seated cavity; likewise, where the removal of overlapping portions of the gum is rendered necessary; also, the cleaning of and removal of tartar from teeth where the gum is inflamed and sensitive. These and other operations of a like nature, which it is needless to specify, may be rendered entirely painless by the proper application of this valuable drug. The relief of pain in such cases is a boon to patients and a comfort to the operator, capable of being appreciated only by those in daily attendance upon operations in the mouths of nervous people.

A brief general description of this interesting plant, and of its active principle as used in solution, would not be amiss. Coca was regarded as a divine gift by the aborigines of South America,—as a panacea for men's misfortunes and infirmities,—making the sad gay and cheerful, the weak strong, and appeasing the cravings of an empty stomach. The laborer, after chewing a quantity of the leaves, goes cheerfully to his task, and thinks not of hunger so long as the influence of the drug lasts. It has a bitter taste, and operates as a stimulant, producing a general excitation of the circulation, nerves, and muscles, and increasing both mental and physical vigor. If used to excess, it causes delirium. Unlike alcoholic stimulants, its use is not followed by depression. An erroneous idea seems to have been entertained by some as to the preparation of the drug, its solubility, and also as to the strength of the solution from which may be expected the most satisfactory results; principally, I think, because cocaïne and cocaïne chloride have been referred to indiscriminately. The former is a comparatively insoluble alkaloid (soluble in 720 parts of water, and more soluble in alcohol and ether), the latter being a soluble chloride, easily dissolved in water. Cocaïne is the alkaloidal principle of the *erythroxylon coca*, a small shrub indigenous to the mountains of Bolivia and Peru, and when obtained in a pure state is in colorless prisms, and of a strongly alkaline reaction. It is derived from an infusion of the leaves of the plant, this solution being rendered alkaline, and then evaporated with ether. The preparation used in surgery, and the one attracting so much attention at present, is the chloride of cocaïne (as before intimated, commonly called cocaïne), a grayish-white powder, and, like most chlorides, readily soluble in water, to which may be added a few drops of alcohol to preserve the solution when it is to be kept constantly on hand. When used in pure alcohol, and applied to the mucous membrane, the solution causes irritation and sloughing. The best effect to be obtained by the use of this drug

in the mouth is from a two to four per cent. solution, and it should be applied to the parts to be operated upon with a small camel's-hair brush, or a pledget of cotton, wiping the parts as dry as possible before applying the solution, and keeping the mouth open, thus preventing the washing away or dilution of the drug by the fluids of the mouth.

Its anesthetic effect in the extracting of teeth is regarded by many as impossible, or at least so insufficient as to be of but little practical benefit; but I can say that I have used it with results exceeding my most sanguine expectations, being able to extract diseased and sloughy roots without perceptible pain, and having extracted a number of teeth firm in the jaw for different individuals who have declared that they suffered no pain whatever. There have been a few cases which, by reason of the poor quality of the drug, or the idiosyncrasies of the patient, have not been attended with such good results, the patients stating that they felt some pain, but that they would be satisfied if they never suffered worse in operations of the kind. One patient, who had been badly salivated, did not seem to experience any effect from its application upon the gum, but when applied to the tongue the peculiar sensation of numbness was apparent.

One of my most interesting cases was the treatment of an alveolar abscess, resulting from a diseased lateral incisor, for a highly sensitive and nervous lady. After cleansing the root, one of Morey's drills of medium size was passed entirely through the apex. It being necessary to remove the necrosed bone, an application of cocaïne was made to the gum, and after a few moments I passed the point of a hypodermic syringe through the partly united fistulous opening, and injected a few drops of the cocaïne. At the expiration of five minutes I proceeded with the engine burr to drill out the bone, which was accomplished without the usual protestations and shrinking from pain, the patient remarking that she felt no pain at all. A similar injection of Listerine was made through the root, it passing readily out through the opening in the gum. The anesthesia lasted twenty minutes, and had a radius of half an inch from the point of injection. To test its effect, I passed a bistoury through the gum, and as far into the bone as possible, in several places; and the patient, being told to cleanse the mouth, asked where the blood came from, thus proving the anesthesia to be complete. On the return of the patient, two days afterward, the parts were in a perfectly healthy condition, the abscess having healed. I then filled the tooth without further treatment. This case occurred early in November, and I have seen the lady a number of times since, and found the tooth to be perfectly healthy.

I have since had two cases of a similar nature, both being attended with the same happy results.

The removal of a fractured portion of the alveolus, caused by the extraction of a lower right third molar, for an elderly lady, brought to my office by a neighboring physician, was effected very successfully. The tooth having been removed some eight days previously, and the parts being much swollen and very painful, an application of a four per cent. solution was made to the gum, and about four minims were dropped into the alveolus. Within ten minutes the bone was removed, it being about one-third of an inch in width, and one-half an inch long. The operation was attended with no pain, and with but very little hemorrhage.

Another great advantage to be derived from the use of this drug is in the fitting of gold bands upon the roots or necks of teeth, preparatory to substituting artificial crowns and bridge-work, where it becomes necessary to place the band well under the gum. This can be accomplished in cases of the most delicate persons, with no attendant pain, by an occasional application of the cocaïne.

Although not as yet fully understood as regards its applicability to dental surgery, the brief past of cocaïne bespeaks its universal adoption in the future; and its introduction marks an epoch in the history of dentistry, and a step forward in the triumphant progress of science and scientific research, the importance of which can hardly be overestimated. Notwithstanding its advent is met with frowns of disapproval by the conservative element of the profession, and by those who have not the inclination to exert themselves to the extent of making a thorough investigation into its merits, it promises to override all opposition, and by intrinsic worth to win for itself a permanent place in the operating room of every enterprising and successful dentist.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a regular monthly meeting, November 18, 1884, at the house of Dr. J. Morgan Howe, No. 34 West Thirty-fifth street.

The president, Dr. William Jarvie, in the chair.

Dr. J. Bond Littig. I present a case of irregularity only for the purpose of showing my method of advancing the upper incisors over the lower. It is the case of a lady, twenty-five years of age, whose mouth had been very much injured by some energetic extractor,

who not only extracted the sixth-year molars, but also the cuspids; consequently the teeth in the upper arch had fallen inside of the lower. The lower front teeth had been worn to such a sharp edge by the abnormal occlusion of the upper teeth as to cause them to constantly cut and lacerate the lips. I suggested the feasibility of expanding the upper arch, and moving the incisors forward so as to give space enough to insert two artificial cuspids. The lady, who was a music teacher, said if I could do that without putting on appliances that would be conspicuous she would be very glad to have it done. I first spread the bicuspids and molars by means of a rubber plate and jack-screw. I then made a rubber plate to fit closely against the palatine surfaces of the front teeth, with clasps to fit the molars, so as to hold it firmly in position,—for success depends upon getting a firm attachment for the plate; and when I cannot get this in any other way I run the plate over the back teeth. I then drill small holes in the plate behind those teeth that I wish to move, so as to enable me to sew on pieces of elastic band from time to time as the teeth move out. The rapidity with which this arrangement moved the incisors forward encouraged me so much that I have continued to use this method in all similar cases that have come under my care in the past eight years. I think it more advantageous than most other methods, as there is nothing to get out of order, and but little attention is needed on the part of the dentist after the plate is put in the mouth, as the patient or parents can sew on other elastics as they are needed. I gave Dr. Perry one of these plates, and I supposed he would be here to-night to present it. It is one that I made to move the superior incisors over the lower teeth, for a girl twelve years of age. She returned to my office in about a week with the teeth in their proper position. The child's mother sewed on the elastics at intervals until the regulation was completed. In the first case I have described I was in no haste, on account of the age of the patient. I think about two months elapsed before it was completed.

Effect of Pulpless Teeth when Left in the Jaws.

President Jarvie. During the last eighteen months a number of articles have been published in the *Medical Record*, by Dr. Samuel Sexton, of this city, upon the effect of pulpless teeth when left in the jaws. These articles have attracted considerable attention among the members of our profession, and there is a most decided dissent on the part of many dentists from the conclusions arrived at by Dr. Sexton, although there may be some who agree with him. These articles have excited such interest that the Executive Committee of the Odontological Society have deemed it proper to make

them the subject for discussion this evening, and to this end several of our members have looked over the articles and will speak upon them.

Dr. N. W. Kingsley introduced the subject of the evening by reading from the *Medical Record* of October 4, 1884, a report from the aural service of Samuel Sexton, M.D., entitled "Pain in the Ears due to Irritation in the Jaws." Eight cases of otalgia were described and diagnosed as due to the irritation of carious and diseased teeth. In reference to the treatment of these cases, it was believed that, "since dentistry had become such a popular business, and dead and diseased teeth had been so carefully retained in the jaws, through their influence, especially among the better to do, nervous diseases about the head were becoming alarmingly common." He also read from the same number of the above journal an editorial on "Dead Teeth in the Jaws," in which the editor says:

Perhaps the time is nigh at hand when medical men should be themselves better informed concerning diseases of the jaws and mouth, rather than refer the ailments of this region to individuals whose limited knowledge of medicine does not prevent them from "treating" dead teeth long after their presence in the jaws has given rise to alveolar abscesses and neuralgias more or less painful. It would not be strange if, in the course of events, the day would soon come when all teeth without pulps, and hence in process of more or less rapid decay, as well as those which the deposit of tartar, or other cause, had entirely divested of periosteal nourishment, would be promptly condemned as unfit to remain in the jaws,—regarded, in fact, as foreign bodies liable to give rise not only to cerebral irritation and disease in the organs of special sense, through the propagation of local disturbances in the mouth to the regions mentioned, but to endanger likewise the general health through purulent matter discharged into the mouth from alveolar abscesses, to be continuously swallowed for a long time, or, indeed, in some instances, to be absorbed and thus produce septicæmic poisoning. It is certainly gratifying to note the establishment of instruction in oral surgery in some of the medical schools, and it is to be hoped that this subject will receive the attention its importance demands.

Several replies to the foregoing were published in the *Medical Record*, which Dr. Kingsley read, and then also read a communication from Dr. Sexton, in the same periodical for November 8, in which he says:

Lest silence might be construed as yielding assent to your correspondents' views, I would beg space to reply briefly to some of their strictures. * * * The gist of the whole matter, however, seems to lie in the question, *Whether it is safe practice to retain dead teeth in the jaws.* * * * From a review of this subject we were further led to believe that in the case of no dead (pulpless) tooth, however carefully treated and filled, can it ever be successfully demonstrated that a slight irritation is not constantly present, although no appreciable irritation may be experienced by the patient.

In regard to the treatment of pulpless teeth, the practice in vogue seems the reverse of procedures founded on well-established surgical principles, since stop-

ping the natural outlet for the escape of putrescent products from portions of the pulp left remaining in the canal and in the dental canaliculi, through the exterior part of the tooth itself, makes their passage into the tissues underneath unavoidable. This diversion of the drainage must be of questionable propriety in many instances, since the tissues about the roots of dead teeth are liable to become infiltrated with the products of decomposition, the absorption of which, when slowly formed, is much more liable to contaminate the system than the discharge of pus into the mouth from an alveolar abscess. Furthermore, inflammation of exposed dentine cannot surely be entirely arrested in any case by filling the pulp-cavity with any known extraneous material, and especially is handicraft wanting to even imperfectly protect the minute and often tortuous canals leading down to the apical foramina of the majority of the teeth. The most skillful operator can, under these circumstances, at best but hope that his work will not soon be followed by trouble arising from the escape of deleterious matter into the tissues about the root, or the development of pericementitis. He is able only to offer a hopeful but uncertain prognosis in these cases, but the patient may all the same remain an unconscious sufferer in respect to the slow but persistent irritation of the surrounding tissue; the irritation thus propagated from the dead tissues of the dentine will sooner or later most likely be transmitted through the tissue of the cementum to the periosteum. It is true that through the periosteum alone the dentine may long derive some nourishment, yet in the meantime periostitis often exists. * * *

That a defective tooth in many instances may remain in the jaws of a healthy person for an almost indefinite period without doing appreciable harm, surely does not warrant the risk being taken in a very large number of cases, since what may be tolerated quite well in the strong and robust will set up serious trouble in those who are run down from any cause, in subjects of catarrhal affections, and the like; in these the more an offending tooth is "treated," the worse in many cases it will be for the patient.

In the *Medical Record* of November 8 the following editorial article appeared:

Dead Teeth in the Jaws.—It would be well if the dead (pulpless) teeth filled and left in the jaws of people were labelled "at the owner's risk," and all golden "crowns" and "bridge" structures attached to dead teeth marked "extra hazardous;" for it appears that when the pulp of a tooth has been removed life no longer exists in the dentine, which derives its nourishment from the pulp, and there is no way of preventing the dead matter left in its canaliculi from undergoing decay for an indefinite period of time. * * * It would seem that dentistry has perhaps been over zealous in its efforts to retain defective teeth in the mouth, or to supplant them with apparatus which often proves to be anything else than harmless to the patient. In carrying both of these branches of dentistry to what the medical mind regards as a dangerous extreme, the health of the patient has too often been lost sight of. This, after all, naturally enough, was to be expected so long as medical men relegated the management of nearly all diseases of the mouth, such as the removal of dead teeth, the treatment of alveolar abscesses, diseases of the antrum of Highmore, and facial neuralgias, to dentists who possessed very little if any knowledge of medicine. It is in consequence of this course that the treatment of jaw diseases has been lost sight of by the general surgeon, and we fear that the well-intended efforts of dental schools to impart

surgical knowledge to the mere mechanics who constitute by far the greater number of their students will not remedy this neglected feature in medical education.

Dr. J. Morgan Howe. We should congratulate ourselves and the medical profession that Dr. Sexton's observations and writings have awakened an interest in teeth and their conditions on the part of the medical profession. I think that from this time the medical profession will take more serious cognizance of teeth as factors in disturbances which are reflex in their nature. The ear appears to be the most liable to be disturbed by dental irritation, but the eye does not escape in some cases. About a year ago Mr. Henry Power, of London, read a paper before the Odontological Society of Great Britain, citing quite a number of cases in which diseases of the eye, both functional and organic, were shown to be produced by dental lesions. But the teeth as factors in reflex disturbances have too frequently escaped the attention of general and special practitioners in medicine. Only scattered references to teeth as disturbing elements are to be found in general works on surgery and medicine. In 1877 Dr. Burnett, and in 1879 Dr. Woakes, of England, in works on the ear, showed the effects of dental irritation on that organ; but dental authors have long ago recognized many reflex disturbances produced by teeth, affecting the ear, eye, uterus, and general muscular system; many such cases are recorded in the works of Garretson, Tomes, Salter, and Wedl. But these disturbances are not altogether due to dead teeth; exposed pulps, pulp-stones. growths of secondary dentine, exostosis, or hypertrophy of the cementum, and the process of dentition, are each of them capable of causing, under certain conditions, serious reflex disturbances. Dr. Sexton, however, calls attention only to pulpless teeth, and his conclusions seem to be that they are not fit to remain in the jaw; that they are dangerous, and that dentists are imposing a risk in persuading their patients to retain them by treatment and filling; and the editor of the *Record* says that such teeth should be labelled "at the owner's risk." The argument on which these conclusions are based is fallacious, because based on false premises. The death of the pulp and dentine do not of necessity interfere materially with the nutrition of the cementum, because dentine and cementum have their sources of nourishment from different directions, and the periosteum of the dental socket is not necessarily affected by the absence of the pulp. The cementum may continue to be thoroughly well nourished through life, if irritation from septic matter in the pulp canal is prevented or arrested.

A successful refutation of Dr. Sexton's negative proposition would perhaps be difficult. He is "led to believe that in the case of no dead tooth, however carefully treated and filled, can it ever be

successfully demonstrated that a slight irritation is not constantly present, although no appreciable irritation may be experienced by the patient;" but I can affirm that I have seen a great many dead teeth that had been filled by other dentists and by myself, both before and after inflammation and abscess, that have been useful for a number of years, and the patients could tell no difference between those dead teeth and the other teeth in their mouths. I do not doubt that all present could give similar positive testimony. I have in my own mouth four dead teeth,—three molars and a bicuspid. The roots of one of the molars have been filled for fifteen years, and since that time I have never known any difference between that tooth and any other tooth in my mouth; and that is also the case with those filled more recently. I am not, unfortunately, a specimen of physical robustness; yet none of these dead teeth have ever to my knowledge produced any reflex irritation. I do not suffer from neuralgia, nor earache, nor any such trouble, and I am fully convinced that my own experience is not an exception, but the rule, in cases of pulpless teeth properly treated and filled. I would call your attention to one other point, which we have all observed,—that it is not an uncommon thing for old, pulpless roots, lying over on their sides, almost on top of the gum, to have the periosteum and cementum of the side that is attached so nearly normal in vitality and function that such old roots may remain firm and sometimes serve as grinders for years. I would express the opinion—and I am sure it will be seconded by some of you—that the unwise and indiscriminate capping of diseased or irritated pulps is a much more prolific cause of irritation, either local or reflex, than the proper treatment of dead teeth.

Those who treat dead teeth successfully do not in any respect reverse the procedures of old-established surgical principles, as Dr. Sexton seems to have been informed. Since he has been so unfortunate in his observations of the treatment of dead teeth, I must conclude that those whose operations have come to his notice have adopted a new method of practice. No well-informed dentist thinks of "stopping the natural outlet for the escape of putrescent products," by filling the tooth, until all "putrescent products" are removed or rendered aseptic, and the abscess, if one has existed, is healed. After that drainage is no longer required, as Dr. Sexton knows. There are many, I am happy to say, who treat pulpless teeth with success, and medical men, if they had opportunity to observe the cases, would acknowledge it, I think. I have seen failures, too. Roots which had been filled were a source of irritation. I have no doubt we have all seen such cases, but, in almost all that have come under my observation and treatment, I have

found, on investigation, that the lack of success was due to imperfect root filling. I cannot claim any superiority for myself in their treatment; I have seen so many cases, from the hands of so many good dentists, that the principles of treatment and the fact of success are well established. It is not to be wondered at, however, that medical men should entertain such erroneous impressions in regard to the relation of pulpless teeth to the surrounding tissues, for these extracts which have been read from the *Medical Record* show a lack of accurate knowledge of dental anatomy and of the physiological relation of the tissues in and around the teeth; and it seems also that Dr. Sexton has seen some mistakes made by "dentists of repute," and, as extraction of the offending tooth resulted in cure, he has concluded that extraction is the only cure. But with increasing observation and knowledge the conclusion will be recognized as unwarranted. We should be satisfied. The present position of these medical men is a long step in advance, for the dangers incident to diseased teeth are recognized.

President Jarvie. Dr. Sexton was invited to be present this evening to listen to and take part in the discussion. He has not arrived, but I understand that he has a severe cold, which undoubtedly is the cause of his not being with us. Dr. Abbott, who is quite intimate with Dr. Sexton, has seen many of these articles before they were published, and is quite familiar with the entire subject. We will now hear from him.

Dr. Frank Abbott. With reference to Dr. Sexton's absence, I would say that I saw him a day or two since, and found him quite ill with a severe cold; besides, he is extremely busy in preparing papers which have been promised; but he said that if he could get away, and thought he was justified in coming out, he would be here this evening. I would not attempt, Mr. President, to criticise nor even refer particularly to the articles published upon this subject. Some statements contained in those from Dr. Sexton may sound queer to us, but, coming as they do from a man who is not familiar with the technical terms and the ways of expressing one's self in our specialty, it is not strange that he should make some mistakes. As I understand it, the main question to be considered is, Do the irritations caused by dead or pulpless teeth in the mouth affect the general health?—or, putting the question broader and more comprehensively, *Is the general health affected by dental irritation?* Dr. Sexton has something over three thousand cases that he has made a record of in his private practice and at the New York Eye and Ear Infirmary, all of which came to him for treatment of some disease of the ear. In every case the patient was recommended to have certain diseased teeth or roots of teeth removed from the mouth.

In each the removal of the teeth seemed to affect the case favorably, and in a majority of them the disease of the ear was absolutely cured. This is a revelation not only to dentists, but to the medical profession as a whole; especially does it impress upon the minds of oculists and aurists the necessity of examining the mouth and teeth, or the consultation with a competent dental surgeon, to see if there is any trouble which might cause the affection of the eye or the ear they have under treatment. I think it a great pity that we cannot have in New York some oculist who would take the same pains that Dr. Sexton has taken, and make a similar record of cases with reference to diseases of the eye. Such statistics would be very interesting and instructive both to the dentist and to the general practitioner. I have had many cases in my practice where operations upon the teeth have very favorably affected diseases of these remote organs, and often cured them altogether. I have seen the good results obtained from the removal of wisdom teeth, for instance, where diseases of the ear had been treated by aurists without affording relief, and where the extraction of the wisdom teeth was followed by almost instant cure. Not long since I had a case that was in the hands of an aurist of this city. After treating it three or four weeks, he told the patient that he could not tell what the cause was of the inflammation and pain in her ear, and did not know what to do to relieve it. He is an excellent man—one who understands his business; yet there was something about that case that was a mystery to him. The patient applied to me to learn the cause of and obtain relief from pain and soreness in a right lower first molar which I had filled for her some fifteen months before. I found that the pulp was dying. I opened the tooth at once, and the moment I penetrated the pulp chamber the pain in the ear, which was at that time quite severe, left her, and in two days' time the ear was perfectly well. It has given no trouble since. Such cases can be enumerated by the hundreds, perhaps thousands, by gentlemen present. That there is a certain amount of irritation produced by all pulpless teeth in the mouth, I have no doubt whatever. That it is latent or secluded in many instances, I know very well. Patients tell me they have such and such dead teeth in their mouths; that they are as good as any teeth they have. If, however, with my thumb and finger, I move one of them back and forth, or strike it gently with an instrument, they say it has a different feeling from that of a living tooth,—it has a dead, numb feeling. Still those teeth do not pain them ordinarily; they have no sensation of soreness in eating; consequently they are kept in the mouth year after year, and patients are happy in the delusion that they are "rid of trouble from those teeth because they are dead."

I wish to call your attention particularly to one statement that has been made by Dr. Sexton about the *permanent retention* of teeth in the mouth. What brought it about was the seeing of some cases of so-called bridge-work, where the crowns of half a dozen teeth have been attached to one or two roots, and those roots were expected to stand the strain of mastication of that excessive number of crowns. That is a practice from which it would seem that a great deal of trouble might arise, and that is what the author of the articles referred to meant by the "retention permanently" of sets or partial sets of teeth in the mouth.

It is not exclusively diseases of the eye and ear that we have to contend against, but other diseases, such as neuralgia and abscess of the antrum, caused by diseased and dead teeth. We operate upon the teeth, look around the mouth, and find no evidence of anything out of the way; still, in many cases, if we would question the patient, we would, perhaps, discover that there is an excessive discharge from the nose on the one side or the other, for which they are under treatment for nasal catarrh, and an investigation would determine that, in many instances where we do not suspect it, there is abscess of the antrum causing it. The oculist and the aurist see their patients for their specialties; they know nothing about the teeth, and so they fail to discover any connection between them and the disturbances they are called upon to treat. In the same way people come to us to consult us about their teeth. They say nothing about having any ear or eye trouble, because they go to some specialist for the treatment of those diseases, and for neuralgia or catarrh they probably go to a specialist or a general practitioner. All these specialists and general practitioners have patients coming to them for treatment of special diseases, and the one knows nothing of what the other has done, nor are any questions asked of the patient. I have a case in hand now, of a very eminent gentlemen in this city, who has had for about five months a very severe sore throat, for which he has been under treatment. He has been a great smoker, and his physician told him he thought he had smoker's sore throat. From examining his throat he could account for the trouble in no other way than from smoking. Consequently the gentleman reduced his smoking to one cigar a day for several months, but experienced no relief whatever. About ten days or two weeks ago he smoked his last cigar, stopping it altogether. The same day that he quit smoking he came to my office and said he had a tooth which was giving him a great deal of trouble, and wished me to examine it. He said that Dr. So-and-so thought it ought to come out; it was giving him so much pain. I extracted it, and the pain subsided, and that part of his trouble was gone.

He then expressed a desire to have his teeth generally attended to, and I made an appointment, telling him I fancied his throat would feel some better when the work to be done in his mouth had been completed. A few days after that I saw him, and he said his throat began to feel a little better. I went on with the work, and took altogether four teeth out of his mouth, each one of which any competent dentist would say was sufficient, possibly, to cause his sore throat,—at least that it would be a factor in that disturbance. After the removal of those teeth his throat improved very materially,—so much so that he felt quite delighted at the thought that he might soon take up his smoking again. I have been informed by his son since that his father's throat is entirely well. I think we ought to thank Dr. Sexton for the excellent work he has done, and for calling the attention of medical men particularly to the possibility of disturbances in various parts of the head and of the general system being due primarily to dental irritation.

Some one was telling me not long since—I think it was Dr. Woodward—that a patient of his had been entirely relieved of a very severe pain in the side, I think in the region of the pectoral muscles, by the removal of a filling where the pulp had been capped. That kind of irritation, as Dr. Howe remarked, is prolific of much pain,—at least if the work is not very carefully done. I really think, however, that it is our duty to save every tooth alive if we can, in order to prevent possible alveolar abscess, as well as discoloration of the teeth; and, altogether, I think it is much less trouble for us than it is to treat them after the pulps are dead. There are many teeth from the roots of which it is impossible to entirely remove the pulps, and, if any portion is left in, decomposition will pretty surely follow in many cases, unless it is so embalmed as to prevent it, which is not always practicable, because the pulp canal is often filled up with the dead pulp so solidly that it is next to impossible to get antiseptics in and around it. Added to this is the putrefying organic portion of the dentine itself, which, I think, is no small factor in periosteal irritation. The effort to save teeth in many cases where it is attempted is, in my judgment, injudicious. I think the retention of teeth in the mouth when they are disturbing the patient, either locally or remotely (which may generally be determined by consultation if desired), is "ill advised." The patient suffers more from the presence of such teeth than they (the teeth) can possibly compensate. There are many cases, in my opinion, of what is known as pyorrhea alveolaris where teeth are kept in the mouth that are a source of constant irritation, and which never subsides as long as they remain. However, I never allow a case to pass without an attempt to save the teeth if they

have antagonizing teeth and can be made useful. There are many cases of such teeth that have no antagonists, and are the source of a great deal of suffering. I have no doubt that, in cases where such teeth in the upper jaw have no antagonists, exostosis occurs in mouths that are otherwise healthy, simply because the weight of the teeth produces constant irritation, and results in a thickening of the cementum and consequent enlargement of the root of the tooth, which causes severe and lasting pain. A few days ago I had a case of this kind. The tooth was extremely sore, with no antagonizing teeth below. The pulp was alive; a small filling was in the crown; the alveolar process had been lengthened, or had grown down considerably by the suspension of the tooth, which was an eighth of an inch below its normal position. There was a thickening of the bone all around it, amounting to what is known as hyperostosis. There are many diseases, I have no doubt, which are really due primarily to dental irritation, many of which are never treated at all. I believe that not more than one-quarter of the people in this great, enlightened city of New York attend to their teeth, or have a regular dentist; the other three-quarters have nothing done except to have them extracted as soon as they become troublesome. We see an illustration of this at the infirmary of the college. Thousands of people come there who never saw a dentist's chair until then. They include old and young,—men, women, and children,—with all kinds of teeth and all possible diseases of the mouth that you can imagine, seeking treatment. Is it, therefore, to be wondered at that Dr. Sexton, or any other physician attached to an eye and ear infirmary in this city, who will take the pains to record correctly the cases that come under his observation, should get results similar to what we have reported here? I think we are greatly indebted to Dr. Sexton for what he has done, and let us hope that somebody else will record and report similar observations in in other directions. The results are certainly interesting and instructive, and will tend greatly to relieve suffering.

President Jarvie. We had expected Dr. Shrady, who has written some of the editorials that have been read, to be with us to-night. He is not here, however. We have heard as yet in this discussion from none but dentists. We have with us Dr. Houghton, a gentleman who has devoted his attention especially to diseases of the ear, and we should be pleased to hear from him.

Dr. Henry C. Houghton. I should be guilty of discourtesy if I did not respond to your invitation. A kind invitation that I received from my friend, Dr. Howe, brings me here, and in view of what is before me I am disposed to say,—save me from my friends. In considering this matter I am reminded of a little story which is told

of some gentleman who was visiting an insane asylum. As he was going about the wards of the asylum, one of the lunatics, whom he did not suppose was an inmate of the institution, fell in conversation with him, and as they went along they passed by a hobby-horse. The gentleman remarked, "I see you have your hobbies here as well as we have outside." "That is true," replied the new acquaintance; "but there is a difference." "How is that?" "Well, in here we ride hobbies, and outside the hobbies ride you." That I believe is true in almost every direction. One is reminded of the poet's description of the old schoolmaster:

> "And still the wonder grew
> That one small head could carry all he knew."

It seems to me that the physician should, to use the illustration of the old legend, look on both sides of the shield; not have one side seen by one, and the other side by another; and I think the public will get great good out of a discussion such as this has been on this subject, by those who may be considered hobbyists on both sides. I have been much gratified by what I have heard, and instructed also; and I will, with your leave, refer to my own experience. In the New York University I was associated with Dr. Roosa, and since 1868 I have been connected with the New York Ophthalmic Hospital, at the corner of Twenty-third street and Third avenue. In these years my attention has been forced unceasingly to the fact that there is a relation between dental conditions and trophic changes in the ear; but to say that in every case where there are carious teeth there is necessarily a neuralgic condition, or trophic changes going on, seems not to be sustained by the facts. That there are facts pointing to such relations in very many cases every careful observer cannot but be forced to acknowledge. The matter which was touched upon by Dr. Howe seems to me to be conclusive on that point. My own observation, in adults particularly, is that live teeth, improperly filled, under certain conditions, are a more prolific cause of neuralgic reflex conditions than dead teeth in which there are products of inflammation. Then, again, live teeth that have been properly treated may produce a temporary reflex condition which will be overcome by a short lapse of time.

A young lady was brought to my office only a week or ten days ago who had had, in my judgment, admirable work done on her teeth, and everything was reported by her dentist to be in excellent condition; but after the work was finished there was set up a very severe otalgia neuralgica, and a very severe odontalgia. Her brother, who was a competent, well-instructed scientific man, took her again to the dentist, who pronounced the work all right. Not

being satisfied as regards the condition of things, her brother brought her to me. I found no evidence whatever of any inflammatory action that ordinarily attends constitutional disturbance. In examining the related parts, there was no indication of local inflammation. I satisfied them both that they had no reason to condemn the work of the dentist as in any way objectionable, and in a short lapse of time that reflex action had all passed away.

Another case will illustrate the same thing in faulty work. A lady, thirty-two years of age, had some dental work done, which was immediately followed by facial neuralgia and otalgia. She was taken to the dentist by her father, who is a teacher in one of the public schools, and the dentist declared the work to be all right. She was then taken to an aurist, a young man who, perhaps, had not had much experience in that line, and he examined the case and explained the neuralgia as being due to sub-acute otitis, and he treated the case intelligently by mechanical means. Then a council of the dentist, the aurist, and the family physician was held, and the conclusion was that the patient should go to the country for the summer. She went, and was gone three months. During that whole time she suffered from severe neuralgia. On her return to the city I saw her, and, in examining the case, I put a dental file between two crown fillings in the lower teeth ; it seemed to me that the fillings were too high ; that the crown was filled to an unwarrantable extent, so that the whole force of the jaw was brought upon these two fillings, and that was an explanation of the neuralgia. The removal of those fillings relieved the neuralgic trouble immediately, entirely, and permanently. I advised her to have all the other fillings removed and the work put in proper order. Since that time I have received a letter from her expressing great gratification at the result.

I will recite one other case. A gentlemen, fifty years of age, had a catharrhal difficulty in both ears. There was a condition that the aurist would recognize the world over. On the right side the hearing distance was very much reduced, about eight two-hundred-and-fortieths (8-240), as my recollection is. I treated that man to the best of my ability with the ordinary mechanical means, and by the administration of such remedies as the case seemed to indicate, and I improved the hearing up to four or five times the measure I found at first. Then there came a point when there was a relapse and almost complete loss of the amount gained by the treatment. I made another examination, and expressed the opinion that there was a condition of the teeth that should explain the difficulty. The gentleman pooh-poohed at it, and, as he was sent to me by the late John F. Gray, M.D., a man much older than I, he went back to him,

and was advised to follow my directions. He did go to a dentist, who removed a filling in one of the teeth and found a condition which explained the whole matter. He treated that tooth, and the other teeth related to it, for quite a long time, thereby removing the cause of the disturbance, and the neuralgia was cured. The symptoms of this man's case were somewhat remarkable. He not only had facial neuralgia and neuralgia of the ear, but also of the muscles of the right side of the neck, and of the shoulder and arm as far as the elbow, and a portion of the sympathetic supply of the right side. And all this trouble disappeared as if by magic when the teeth were treated.

I can only express my gratification and my thanks to the gentlemen for the instruction received during this discussion. I believe that the public will derive great benefit from the intelligent, careful, and patient consideration of the views of both parties in any scientific discussion which brings out the observations and experience they obtain in their different lines of practice.

Dr. J. W. Clowes. This subject interests me very much, and possibly I may be able to contribute something of value to the evening's discussion. During my pupilage what we now know as alveolar abscess was called an "imposthume." Whatever that might signify, it was a part of my early experience to comprehend its meaning through personal suffering. I became the possessor of a devitalized nerve through the agency of a dentist who wedged my teeth apart. As concomitants of this possession, in a superior lateral incisor, irritation, inflammation, and suppuration ensued, for which there was no cure known save by extraction. As to any general or lasting disturbance of the nervous system, or morbid effects in parts remote, the comprehension of the learned had failed, as yet, to consider them a cause. In the midst of my studies, dimness of vision, inflamed lids, and intolerance of light came upon me like a pall, and my left eye gave out. Physicians, surgeons, and oculists were consulted, but their efforts availed me nothing. I was consigned, at length, by the decision of the most eminent among them, to inevitable blindness! Thus the desires, the aspirations, the longings for a useful life were nearly extinguished by the ignorance of professional men. My imposthume had volcanic traits, and was subject at intervals to painful eruptions. It was during one of these that I determined to end the suffering which its presence created, by parting with my tooth. This much was known of cause and effect, and I employed the knowledge for my benefit. The extraction took place, and three weeks later my eyes, to darkness condemned, were well and strong, and, after the laborious use of forty years, retain an acuteness of vision that asks no extraneous aid or

artificial help. The electric light is an ingenious and effective device for diagnosing diseased conditions, but I need it not. My naked sight informs me correctly of all I wish to know. Returning to the period of my tribulation, it may well be asked, How could such barrenness of information have existed among the professional men of that day? Not one of all their number even suggested the cause of my affliction, and I only came to know it myself through the providential hand moving in answer to my earnest prayer for deliverance and light. "Young man," had been the sentence, "the nerve of your left eye is becoming paralyzed; through sympathy with it, the right one must fail, and you will be blind." The decision was in error; but the impression created, without timely arrest, would have gone on to execution. What, then, was the cause of the evil, and whence came relief? *The cause, as I then understood it, by the revelation of only half a truth, was the presence of a dead tooth;* and this is the point at which I learn our medical friends have arrived. In their search for knowledge they have discovered what the intelligence of our profession has far outgrown. Armed with this partial truth, I felt myself a host, and did battle with disease in many forms.

With good intent I swept from the mouths of my patients all that bore the taint of death. That which saved others had already saved me. I was a conqueror and reveled in success. My laboratory fires were seldom quenched. The hand of labor and the ingenious mind were active in the business of replacement; so that in time the mouths that had been swept were also garnished! My victories had come through sacrifice, and they were dearly bought. *Long since a clearer light and larger truth have revealed to me that the real cause of all my woes was not a dead tooth, but the presence in that tooth of a dead and pestilential pulp.* The local disease might well have been called a *fever in the socket and the gum.* The outgrowth of this was a purulent discharge, which, by its capacity for waste, lessened the material strength and gave distraction to the nerves of sight. Relief, on extraction of the tooth, came from absence of the exciting cause—the fever ceased, and then the nutrient forces took up the work of reparation. Dead teeth may certainly be rendered healthful and harmless in the jaws. *We have but to treat them as we would the habitation in which some pestilence prevails. Remove the cause; prevent its further ingress, and stamp it wholly out by disinfection.* In the light of dental science, the causeless extraction of dead teeth has no more excuse than the demolition of a home that for a time has suffered the visitations of disease. My lone-handed struggle against fearful odds was the initial lesson in a course of studies which have led me on and on, until there seems no limit to the

wonders they unfold. By observation, I have come to understand the ailments of a patient, and can pretty correctly diagnose the condition of his teeth by external indications. The real dentist in a community is a power far surpassing the estimate in which he is generally held. In the oral cavity he finds a varied and prolific field for study and for work. In its harmonies he beholds the portal of a healthful life—in its disorders the floodgate of physical ill. Here are the termini of the neural cords, and the dispatches sent out through them will have their reflex of pleasure or of pain. The incredulous may smile, but the irritant splinter in the foot will not more surely cause a locking of the jaws than an irritant tooth send a twinge of pain to the remotest extremity of a toe.

Adjourned.

E. T. Payne, D.D.S., *Secretary.*

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

Regular monthly meeting, held Tuesday evening, December 2, 1884, in the rooms of The S. S. White Dental Manufacturing Co., corner of Broadway and Thirty-second street.

Dr. William Carr, vice-president, in the chair.

Dr. C. F. W. Bödecker, chairman of the Clinic Committee, reported that at the clinic in the afternoon there were present about fifty persons, and that he demonstrated the Herbst method of filling upon a right superior first molar in the mesial and grinding surface. The first layers of gold were introduced by the Herbst method, until the grinding surface was reached, when the last few layers were condensed by the hand mallet. In the first part of the filling Wölrab's German gold was used, and then some cylinders recently gotten up by The S. S. White Dental Manufacturing Co., which worked nearly as well as the German gold. Dr. Bödecker thinks these cylinders can be used in the Herbst method.

Incidents of Office Practice.

Dr. J. S. Latimer. I yesterday had a case of extremely hard enamel. I made my drills as hard as I could, but they would not cut it. I tried excavators, chisels, and files without success. At last I had to drill, over-much for the comfort of the patient, into exceedingly sensitive dentine, in order to secure the retention of the filling. Concerning the hydrochlorate of cocaïne, I have tried the four per cent. solution several times, and only in about half the cases had it any effect. I doubt, however, whether any remedy would have had much effect upon the extremely sensitive and hard tooth of which I have spoken. Thorough drying of the walls of the

cavity with hot air greatly lessens sensibility, and if, then, the walls be saturated with carbolic acid, excavation will cause little if any pain.

Dr. S. C. G. Watkins. I have kept a record of the cases in which I have used cocaïne up to the present time. The first case in which I used it—the four per cent. solution—was the left inferior first molar of a young lady about twenty years of age, the cavity being on the buccal surface, and the tooth very sensitive. I applied the cocaïne, keeping it in the cavity four minutes; then removed it and proceeded to excavate without causing the slightest pain. The next case, the bicuspid of a young man, was not quite so successful, though nearly all pain was obviated. In the third case there was again perfect freedom from pain after applying the cocaïne for four minutes. The fourth case in which I applied it was also a bicuspid, and to all appearances it gave no relief. I applied it again for five minutes, and again for six minutes, and still with no effect. The next case was a little boy about twelve years of age, and the tooth was so sensitive that it brought tears to his eyes when I attempted to excavate it; but after applying the cocaïne for four minutes he could bear the excavating very nicely, although he said it hurt him some. The next case was a perfect success. Last evening I applied it to two central incisors that were very badly decayed and so sensitive that the lady thought she could not stand the pain. Five minutes after the application I excavated without a murmur from the patient. She said there was not a particle of pain.

Dr. J. F. P. Hodson. I have used cocaïne a few times, and have to report more or less success with it. I wish to speak more particularly of its application to a tooth in my own mouth, and such cases always teach us more than when the experiment is in the mouth of a patient. I applied the cocaïne to the uncovered lingual root of a molar, which had grown so exceedingly sensitive that I could scarcely touch it with my tongue or eat with any comfort. Whether it was because the surface was so hard that no absorption took place I do not know, but I obtained no relief whatever from the application. I then turned to the obtunding material, Näbolï, and obtained the temporary relief I sought. The application was made only for the purpose of relieving myself from the disagreeableness of the sensitive surface that was pestering me. During the last spring, in strawberry time, it got to be exceedingly sensitive, and after that time and during the summer the fruits I have eaten in the morning have not seemed to touch it at all, until lately, since I have been eating the winter fruits, oranges seem to have taken hold of it again. The fact may teach us something as to what fruits and substances will arouse this special sensitiveness.

Dr. Bödecker. I have experimented somewhat with the hydrochlorate of cocaïne, but in a little different direction. I have used cocaïne in several cases of pulpitis, and have in every case obtained the most wonderful results. In one case I could not get the pulp quieted with anything, until I applied the two per cent. solution of cocaïne for about half a minute, when the pulpitis subsided. In another case of very severe pulpitis I applied perhaps half a drop of cocaïne, and it was instantly quieted. Another instance was that of a surgeon in this city who had a very badly decayed wisdom tooth, which he did not want to have filled, and remarked that the moment it began to ache badly it would have to come out. A night or two after that he got a terrible toothache. He applied carbolic acid, but it did not do any good. Then he happened to think of cocaïne, which he applied, and the result he reported to me was the same as in the cases before mentioned—the pain immediately subsided. I have furthermore observed, in cases where the rubber-dam has to be pushed high up under the gum, and which in some instances causes a good deal of pain, that if the gum is dried and the solution of cocaïne applied the rubber-dam can then be put on and the gum pushed away without causing any pain whatever; and afterwards, when the operation has been completed and the emery tape is drawn through, the patient does not seem to feel any pain and the gums do not bleed as much.

Dr. E. T. Payne. I understand that, in the cases of pulpitis relieved by Dr. Bödecker, the pulps were exposed.

Dr. Bödecker. Yes, sir.

Dr. Payne. You made this application and got relief. Who is going to take care of them after that twenty minutes or so?

Dr. Bödecker. I put the cotton saturated with cocaïne in the tooth, and leave it there until I see the patient again for further treatment. It is for temporary relief I use it, just as anybody would use carbolic acid, etc. We have cases in which neither carbolic acid nor anything else we may use will give the desired relief. It is claimed that cocaïne has some action upon the vascular system, producing an anemic condition of the parts to which it is applied. How it acts I do not know.

Dr. Watkins. I would like to ask whether cocaïne deteriorates with age, or light, or heat?

Dr. Atkinson. I think if it is well corked it does not deteriorate.

Dr. F. Y. Clark. Suppose the two or four per cent. solution of cocaïne were to be left sealed up in a tooth for twelve or eighteen hours, what would be the effect upon the pulp of that tooth, or the membrane? With anything having the power claimed for cocaïne in removing extreme sensitiveness of the dentine, are we sure that it

has not some deleterious effect also? I think we ought to stop and inquire into it, and not use so powerful an agent recklessly. It would be well, I think, to experiment for the purpose of finding out how much action it has upon sensitive dentine when it is left in the cavity a number of hours. Until such experiments shall have been made, I think it is necessary to use it with a great deal of caution.

Dr. Atkinson. It is probably best to notice a statement now that is going the rounds of the journals, that there are instances in which fifteen grains of the hydrochlorate of cocaïne have been taken internally and no mischief resulted, except a great amount of exhilaration or intoxication. Other reports state that deaths have occurred from its administration to animals; many of them died when a small amount had been injected into the circulation. Therefore, we had better move cautiously. I have no fear, however, of harm in the direction that Dr. Clark suggests. In the human subject it has never been fatal, so far as my reading and observation have gone; and, reasoning by analogy, we would be able to say with confidence that in its present condition it is not a poison. If there be a possibility of the breaking-up of its molecules, and the formation of other molcules that may hold a poisonous relation to the human body, then we might have cause to fear. In any case, it is well enough to be cautious; to keep the finger-boards of *caveat* before us in the use of this remedy.

Dr. C. E. Latimer. I had a case of excessive sensitiveness, in which I tried cocaïne. The cavity was on the buccal surface of a wisdom tooth and about half covered by the gum. I tried for about six months to operate upon it, but the tooth was so sensitive that I could not wipe out the cavity with cotton without causing great pain. Being unable to put a rubber-dam on to keep the cavity dry, I felt doubt about succeeding with the cocaïne. I tried it, however, keeping out the saliva, but not the mucus. In five minutes there was still sensibility; also in ten minutes; but in fifteen minutes, although the mucus flowed into the cavity, the sensitiveness was removed, and I excavated and filled the cavity without causing any pain. The operation was highly satisfactory to myself and exceedingly so to my patient. I would advise those who apply it a short time, and find it of no effect, to give it a longer time. At an operation in the Mount Sinai Hospital twenty minutes was allowed for it to have its full effect upon the eye. I think it advisable to give it more time to act.

Expert Testimony in Relation to Dental Jurisprudence.

The Chair introduced Dr. J. Allen Osmun, of Newark, N. J., who

read a paper on the above subject, of which the following is a synopsis:

Dr. Osmun. In response to the invitation to address you to-night, I beg your attention for a few moments to a subject which, if not strictly dental, is of importance to us as practitioners of dentistry,—"Expert Testimony in Relation to Dental Jurisprudence."

How often we read of *experts* being brought on either side to help the jury decide some point in jurisprudence, and find that they are diametrically opposed to each other; and this condition of affairs will continue so long as the parties to a suit employ only those who will testify as partisans on the question at issue. This is a subject which is liable to come home to any one of us. We are all liable to be called as witnesses—so-called experts—by plaintiff or defendant.

The law recognizes certain well-defined principles in regard to medical and dental practice. One of these is the exercise of a reasonable degree of skill and care. Webster defines an expert to be "one who has skill, experience, or peculiar knowledge on certain subjects of inquiry—a scientific or professional witness." Thus, it bas been decided that surgeons may know by their skill whether death has resulted from certain wounds or not; an artist or trained art-critic may know better than judge or jury whether a painting is a copy or an original; a practical chemist may know by analysis whether certain specific poisons found in the bodies of supposed victims of suicide or homicide were the cause of death, and thus give the benefit of his knowledge and skill to the courts; a skilled microscopist may determine whether a certain stain is from blood, and proximately from the blood of what animal, and therefore be able to throw great and perhaps decisive light on a case otherwise obscure; skill is recognized in the study of hand-writing, in engraving, etc.; seamen and surveyors may have special knowledge of their respective callings, and can by its possession throw great weight by their evidence. This, then, illustrates what is meant by expert testimony. An expert may therefore be of great benefit to the cause of justice, by testimony regarding facts at issue within the range of his specialty. But the professional expert witness, who stands ready to be engaged upon either side by the highest bidder, and who gauges his evidence by the size of his fee, is the bane of courts, and tends to bring into contempt that class of witnesses, and also to retard justice.

We will suppose a case, for illustration: A patient applies to one of our profession for consultation and advice touching some lesion in a tooth,—say a central incisor. He is assured that the tooth in question can be saved, and submits to the treatment proposed, but

the disease resists all efforts, and at last the tooth is lost. We will suppose the work has been done in a careful manner, and with a reasonable degree of skill. The dentist is brought to trial in a suit for malpractice, and damages are demanded to the amount of one thousand dollars. He calls on his professional brethren to help him in his extremity. The plaintiff likewise calls his witnesses. Dr. A., being asked what he considers the value of such a tooth, might say $500; Dr. B. might answer $100; Dr. C. $50, and Dr. D. that that would depend on what kind of a plate was desired,—that a rubber one would cost $5, a silver one $10, and a gold one $15 or $20. Would such testimony be of much value in assisting a jury to determine what damages should be awarded? Or we can imagine a case where a wisdom tooth has been under treatment for exposed pulp, or in which the pulp has been extirpated and the roots filled. An abscess forms, rigidity of the jaws ensues, making it impossible to get the mouth open in order to extract or treat the tooth. Absorption of pus takes place, with resulting pyemia. Such a case recently came under my observation. Who is to determine whether the patient received careful treatment, and that a reasonable degree of skill was shown? If one of those gentlemen who never have a case of failure in the capping of an exposed pulp, or any ill results from roots that have been filled, should be called upon to testify, there might be a bad outlook in a suit for malpractice. In such cases unbiased expert testimony would serve the ends of justice.

Allow me to refer to a decision that has lately been rendered in this city touching on the question of responsibility. "The professional man, no matter how skillful, who leaves an essential link wanting or danger unguarded in treatment, is chargeable with negligence and answerable for any ill-resulting consequences." The mere possession of credentials to practice does not necessarily presuppose the knowledge required to take the stand as a witness, in the capacity of a dental expert. He should give the most satisfactory proof of special qualification and experience. For the protection of personal rights all men are considered equal before the law, but not intellectually, nor as to competency or incompetency to testify as experts. The custom of allowing plaintiffs and defendants to call their own expert testimony necessarily brings such testimony into disrepute.

In giving testimony as an expert, one should avoid all extreme theories and opinions, and keep close to well-established facts. His testimony will thus have greater weight, and he will probably save himself from a bitter experience.

Dr. Atkinson. If there is a hell on earth it is in a cross-examina-

tion as an expert in the courts of the city of New York. I have been there, and I have the memory of it still. Let me advise: If called upon for expert testimony, do not assume a knowledge which you do not possess. Each one of us is liable to be brought into trouble through the ignorance of our fellows or of ourselves,—but especially of ourselves. The fact is, we should not have jury trials in such cases. It is before experts themselves that these questions should be tried. Two or three experts as a committee would be better than any jury of twelve men that you could select in the ordinary way. My further advice is to keep out of the clutches of the law. Do not sue anybody. In a court of law they will seek to put the worst possible face upon everything on the one side, and the best possible face on the other side. And yet, which of us in a legal contest would not be willing to appropriate favorable testimony, the veracity of which we doubted, or reject that we did not doubt if it was against us. We have got to come to a high standard of morality before we can stand on the merits of a case in which we have personal interest.

Dr. N. W. Kingsley. Dr. Atkinson made a wise remark when he said that the jury system is the greatest fraud on justice that belongs to modern times. I would rather have an honest judge try a case of mine than all the juries I have ever seen. Dr. Atkinson said another wise thing to-night when he said, "Do not sue anybody." That is good advice; but sometimes they may sue you. You cannot keep out of the courts in that way. He can, perhaps; but I can't.

Dr. Osmun. I will relate the cases referred to in the paper, although I dislike very much to speak of personal matters in a paper read before a society.

In the case of pyemia referred to, a physician called upon me one day requesting me to go with him to see a patient, and desiring me to carry instruments to extract a tooth. I went with him and found a lady suffering from abscesses that had formed in the posterior part of the mouth, caused by a wisdom tooth that had been filled. There was great rigidity of the jaws, and I found it utterly impossible to get the mouth open; we tried all sorts of means to produce relaxation of the jaws. We then tried mechanical means, wedging with rubber and with wood, but without success. Two abscesses had formed,—one pointed inwardly and one outwardly. The latter broke, and we tried to open to the other one by pressure, but did not succeed. Absorption of pus took place, and we had a well-defined case of pyemia. The woman had been in robust health, was full-blooded and of strong physical development. In the course of time we got the mouth open and extracted the tooth. We found

necrosis had set in. The history of the case, as I afterwards ascertained it, was this: The lady had gone to a dentist to have her teeth filled,—this one among others. The tooth had never ached, but, on cleaning it out and removing the decayed portions, the dentist said there was a slight exposure of the pulp, and treated it for a day or two. He is a personal friend of mine, and I know him to be a good operator,—honest, careful, conscientious, thorough, and skillful. I cut that tooth carefully in two, in order to see whether the pulp had been devitalized and extracted or not. I found that the pulp had been covered with white oxide of zinc, mixed with oil of cloves, and that over that had been placed a small piece of asbestos, and the cavity filled with oxyphosphate. The cavity had been thoroughly cleaned out, the margins well prepared, and everything about the operation thoroughly done. The abscesses had occurred seven or eight months afterwards. The point I want to bring out in connection with this case is simply this: I had the hardest work in the world to keep that woman from bringing a suit for malpractice against the dentist who had filled the tooth. It was only through the earnest persuasion of myself and another dentist and her physician that she was kept from bringing a suit for malpractice and criminal negligence against a perfectly innocent man.

The other case was one of my own. It was presented at a clinic five or six years ago. One Sunday as I came out of church a gentleman who was waiting for me outside asked me to go down to my office and extract two or three teeth for him. He said he was almost frantic with pain. He was a man of very nervous temperament, and insisted that I should administer gas. He said, "For heaven's sake, don't let me feel any pain." I told him I would give him the gas, and that he would not feel any. I had administered it to him three times previously, with no bad results. There were three teeth that he wanted taken out, two of them with abscesses, and the other one badly broken down. He said, "While I am under the influence of the gas take these two out, and if you get a chance to remove the other one before I become conscious, do so." I placed him under the influence of the gas, which he took nicely; respiration good and pulsation strong. I extracted one tooth; then took out the next one. I said to my brother, "He did not feel it. I guess I will take out the other." There was no movement of a muscle. He was perfectly calm and quiet. I waited a little, thinking he was too much under the influence of the gas, and then extracted the tooth. When he came to he said, "Oh, my! that last tooth; I felt every bit of it." I said, "I guess not; you only dreamed it; you never moved a muscle." "I don't care; I felt it. I will tell you what you did. You laid down one pair of forceps, as

though you did not like them, and picked up another, didn't you?" "Yes." "You extracted one tooth then?" "Yes." "Then told your brother I did not feel it?" "Yes." "You stood back and ran your fingers through your hair?" "Yes." He said, "I would not have felt that pain for $500. I would have given all I was worth for the power to tell you to stop." The next morning, when he got up, one-half of his head was perfectly gray,—and it remains so. A couple of my professional opponents, generous fellows, went to him and told him they would defray all the expenses of a suit against me for malpractice if he would begin it. That was very kind of them, and I ought to feel very grateful. But he did not bring the suit. He went with me to a physician of well established reputation, who gave the opinion that it was merely a coincidence. But suppose a suit for malpractice had been brought, and I had been taken into court,—see the position in which I would have been placed! Yet I was perfectly innocent. I had done my duty thoroughly and to the best of my ability, and there was nothing in the whole operation that has not taken place ten thousand times. The same thing is done every day in the week, over and over again. The unfortunate result is a thing that is liable to happen, although I never heard of such a case before nor since. What is the explanation of it? One physician says it is due to paralysis of a nerve. The hair continues to grow naturally on that side the same as on the other, except the color. There is no loss of hair. Another physician says it was caused by the excessive pain the patient suffered, and another says it was merely a coincidence, and had nothing whatever to do with the operation I performed.

These cases will serve to illustrate the point I desired to bring out, which is that we are liable to be called into court as defendants in cases of our own, or as witnesses upon some question connected with our profession, and that, therefore, it is our duty to be educating ourselves, so that when the occasion arises we can give honest and valuable expert testimony.

Adjourned. B. C. Nash, D.D.S., *Secretary.*

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

The regular meeting was held Saturday evening, November 1, 1884, at the office of Dr. M. Lukens Long, No. 720 N. Sixth street, Philadelphia, President Guilford in the chair.

Henry Leffmann, M.D., D.D.S., professor of chemistry and metallurgy in the Pennsylvania College of Dental Surgery, read a paper entitled

Some Observations on Anesthetics from a Chemical and Physiological Point of View.

Anesthesia is the most precious gift of science to man. The elixir of life and the fountain of eternal youth will never be discovered, but the diminution of suffering is fortunately attainable. It has been well said that in the days before the introduction of anesthetics "surgery was agony."

Very few of the now living surgeons can realize other than in imagination the scenes of the operating room fifty years ago, or contrast the spectacle of a patient bound to the operating table, conscious of every movement of the knife or forceps, or of ligations, with the present method, under which the patient tranquilly sleeps, even during the most formidable operations known to surgery.

The number of substances that have been proposed, and more or less used, for the production of general anesthesia is quite large, and, doubtless, if there were a great necessity for a variety of agents,—definite promise of superior advantage in further research,—the number could be vastly increased. Until a very recent period the method of producing anesthesia was by inhalation, but we have now the process of administration by the rectum, and, although perhaps objectionable and even dangerous, yet the results obtained show that the effects of the anesthetic are due to its absorption into the blood, and not to mere influence on the respiratory tract. Leaving out of consideration nitrous oxide and carbonic acid (the latter having been proposed but never regularly used), the general anesthetics consist of volatile liquids, derivatives of the hydro-carbons, particularly of those low in the series. Many of the compounds of this series are unsuitable, either on account of their slowness of action, disagreeable properties, difficulty of preparation, or other incidental causes. The experience of the surgeons of this country has been practically limited to three substances,—ethyl oxide, commonly called ether; trichlormethane, commonly called chloroform; and ethyl bromide. In their physiological action these bodies are all cardiac depressants, chloroform being the most so. The continuation of life requires the maintenance of the functions of the heart, lungs, and central nervous system. Anesthetics attack all three points, depressing the heart power, disturbing the osmodic processes of respiration, and, by poisoning the blood current, affecting the brain. Yet, notwithstanding this, when used cautiously they may be safely employed. Chloroform is undoubtedly the most energetic of the three. Nothing is more regretful in the history of our profession than the deaths from chloroform administered by dentists. Too much stress cannot be laid on the fact that the heart power is so seriously reduced by

this anesthetic that it is incapable of supplying the brain properly unless the patient is entirely recumbent. We know, of course, nothing about the intimate action of these agents, and the relative danger is only, therefore, a matter of clinical experience; and upon this topic much difference of opinion prevails. In this city, for instance, are surgeons who rarely use ether, and those who never use chloroform. We may get a suggestion concerning the physiological anesthetics from facts recently derived with regard to intoxicating agents, which are somewhat analogous bodies. It is well known, for instance, that the term alcohol, long restricted to the product of ordinary fermentation, has now acquired a generic meaning, and includes a large number of bodies, some closely resembling common alcohol, and others very different. Without stepping too far into the field of chemistry proper, I may recall to your minds the fact that there are several series of these alcohols, of the first and simplest of which, common alcohol, is the second member. Each of these series consists of analogous bodies, presenting gradually increasing complexity of structure, but never departing from a certain type. The chemist recognizes in each alcohol an arrangement of atoms into a radicle characteristic of the alcohol and all its derivatives. The radicles and the alcohols which contain them may be arranged so as to show a regular increase of carbon atoms in the order of the natural numbers, one, two, etc. Now, the researches of Richardson, Rabateau, and others have shown, I think, conclusively that the physiological action increases in intensity and danger as the number of carbon atoms increase, so that while wood spirit (methyl alcohol), with but a single atom of carbon, is transient and slight in its effects, those of fusel oil (pentyl alcohol), which has five atoms of carbon, are prolonged and severe. It would be a mere speculation, but still I think not an unreasonable one, to suppose that a part of this difference is due to the lower osmodic power and greater difficulty of oxidation in the pentyl alcohol, these being the two methods by which the system gets rid of injurious matters. Much of the physiological action depends on the presence of particular radicles, as Rabateau claims to have shown and proved by the fact that two such bodies as pentyl formate and methyl valerate, which have the same composition, will produce when administered very different action, because one will produce in the blood the comparatively harmless methyl alcohol, and the other the harmful fusel oil.

Now, it does not seem too violent to apply these facts to our common anesthetics. Nitrous oxide is a substance as near to air in composition as any compound could be. It is highly diffusible, soluble in water, and, as experiment will easily show, capable of acting as a supporter of combustion. The functions of respiration and

excretion are, therefore, not much taxed by it. It may subserve slightly the purpose of the air which it replaces in the lungs. Ether is a very different substance; its action is more specific, but it is highly combustible,—as much so as alcohol,—and it is therefore quickly and rapidly oxidized, and the result of such oxidation is simply carbonic acid products, to which the blood and lungs are accustomed. As the complexity of the hydro-carbon radicles increases the combustibility decreases, and hence the greater difficulty that the blood has in getting rid of the substance. When, however, we introduce into these organic substances elements which are thoroughly foreign to the processes of nutrition, we get more severe results. Modern organic chemistry has given us extended lists of substances perfectly definite in character, analogous to the true organic bodies, but apparently not only incapable of forming a part of healthy tissues, but also inimical to life. We have, for instance, the substitutive compounds of chlorine, bromine, iodine, nitrogen-dioxide, arsenic, antimony, and mercury. One has only to recall the effect of chloral, iodoform, hydrogen arsenide, and nitro-glycerin, and contrast them with the original organic bodies from which they are derived and to which they are related, to see how the new elements added have increased their toxic action. Here it seems to me we have a clew to the marked action of such anesthetics as chloroform, methane dichloride, ethyl bromide, and carbon tetrachloride. Not only are these bodies difficult to break up (chloroform, for instance, will not yield its chlorine even to silver nitrate), but when broken up the halogen must either be set free or converted into an active form of combination. Observations as to the relative danger of anesthetics, of closely allied character, are not entirely reliable, but one of the most recent essays on the subject, treating of the bodies produced by the successive substitution of chlorine for hydrogen, ascribes the most dangerous and prolonged action to the one containing the most chlorine. The series is as follows:

CH_3Cl. Mono chlormethane.
CH_2Cl_2. Dichlormethane or methane dichloride.
$CHCl_3$. Chloroform.
CCl_4. Carbon tetrachloride.

If the principle here advocated be correct,—namely, that the danger of an anesthetic will be directly as its slowness of oxidation and osmosis, and the presence in it of elements foreign to the typical organic bodies,—we will have indications as to the directions which our researches for new agents should take.

In the actual use of these agents, of course, the physiological action may be controlled by the manner of administration. I have already referred to the danger of using chloroform in the upright

position. It is also important to notice that, unless proper care is taken, we may add the dangers of asphyxia to those of anesthesia. A plentiful supply of air is imperatively necessary with chloroform, and the fact that air can be freely admitted without interfering with the effect is one of the reasons that chloroform is in favor. Ether, on the other hand, will not act unless air be pretty well excluded. Many operators fail to get good results from ether, and give it up because, as they say, they cannot get the patient quiet. Most of those who use ether successfully are in the habit of keeping the towel or inhaler close to the patient's mouth, and by this means the preliminary intoxicating stage is passed. Other surgeons prefer to use ether first very lightly mixed with air, until the sensibility of the laryngeal mucous membrane is obtunded. In this way coughing is prevented. I have been under the influence of ether by both methods, and I must say I prefer the latter. The ether was given to me very successfully, and the recovery from the effect was rapid and perfect. By the other method I was so completely prostrated that it was several hours before I could leave the operating room, and I am sure (although I could not have believed it if any one else had told me) that the odor of ether was perceptible to me in my own head for more than twenty-four hours after administration.

In relation to the condition of the kidney, especially in ether anesthesia, it appears that in cases of marked kidney disease, particularly in the now too common Bright's disease, anesthetics are more than usually dangerous. It appears that ether is especially obnoxious, and I have heard an experienced obstetrician say that he had abandoned its use in producing anesthesia in labor, using chloroform entirely. I do not know that it is possible to explain the specific danger from ether in these cases, but it is probably connected with the manner in which the ether is excreted. At any rate, it is now considered proper surgery to test the urine before using any of the stronger anesthetics. ?

The topics chosen for this paper are too intricate and extended for a single essay. I should like to consider the physiological nature of the analgesic effect of rapid respiration, but I think I have taken up sufficient time, and I would be very glad to hear from those present concerning the questions involved.

Discussion.

Dr. Guilford. I would like to ask you what you consider the physiological action of nitrous oxide, and whether you have made any study of it and of the manner of its action?

Dr. Leffmann. I have never given sufficient attention to it to be able to give what you might call an expert opinion. I think there

is some resemblance in it to asphyxia, but I do not think it is asphyxia proper. I would like to know from some of the gentlemen present, who have had experience in the matter, whether the claim made by some parties who have used the gas, that they can prevent the paleness of the face under its operation, is true or not. I remember, from what I have seen in the office of Dr. Thomas, that the faces were quite pale. I have seen some in which the palor was very marked, and I have seen others in which it was not noticeable. It is possible that by an admixture of free oxygen with the gas, say to the extent of five per cent., the asphyxiating effect might be overcome and the anesthetic effect retained. I intended to have alluded to Paul Bert's recent experiment, in which he uses large volumes of air mixed with the anesthetic, giving, as he claims, better results. But whether the admixture of five per cent. of free oxygen would make any improvement, I cannot say. It is an anesthesia of partial suffocation, and I have sometimes thought it possible that the anesthesia of rapid respiration was of the same nature, and that a person breathing so quickly was subject to the same influence,—the true anesthesia of course being the special action.

Dr. Guilford. If nitrous oxide produced asphyxia, would it not be more dangerous than it is?

Dr. Leffmann. I think the primary stimulating effect of nitrous oxide would seem to show a physiological activity outside of the asphyxiating action. There seems to be an impression on the nerve centers of the body, such as you see in ether and chloroform, and in any other anesthetic. There is a resemblance in nitrous oxide to other anesthetics in that respect.

Dr. Tees. About ten years since, Dr. George Watt, of Ohio, made a series of experiments with nitrous oxide upon his own person. He reported the result in the Dental Cosmos. He said that he came very near death's door during one of the experiments. He found that, by enlarging the orifice in the inhaler, the patient could breathe easily, and change of color in the countenance as well as asphyxia could be avoided. No doubt many of you have seen in children blowing trumpets the redness of the countenance. The effect of exhaling through a small mouth-piece, I think, is somewhat the same. About this time Dr. Kimmel had an interview with me, and I called his attention to Dr. Watt's article in the Dental Cosmos. Some time after this I accompanied a patient to his office, and noticed while she was under the influence of the gas that there was no change in the color of the countenance, and that she breathed easily, as if in a deep sleep. I spoke of this to Dr. Kimmel, when he told me it was owing to the purity of the gas, and also to the large hole in the mouth-piece, suggested to him by Dr. Watt's communication in the Dental Cosmos.

Dr. Gilbert. The less air you have mixed with nitrous oxide the the better success you have in controlling your patient. I think an inhaler with a large hole is preferable, because it is very difficult to breathe through a small aperture. I have tried one of this kind, and I think I had better results from it; but I noticed no difference in the skin, although it may act differently on different persons. About a year ago I was at Dr. Thomas's, and found that he had an inhaler which he had invented with a larger pipe than we can get at the dental depots.

Dr. Guilford. The old plan of administering the gas, breathing in and out of the same bag, was very objectionable. I think the opening in the ordinary inhaler is as large as is necessary. If there is any asphyxia, it is not the fault of the inhaler. In twenty years of experience, in the great majority of cases, I have noticed this peculiar color of the skin, of the eyelids, and of the lips. Did Dr. Thomas explain why he made his large inhaler?

Dr. Darby. The mouth-piece of the inhaler used by Dr. Thomas is very large. He had it made so that the lips could be drawn tightly over it, and held firmly around it, thus preventing the ingress of any atmospheric air.

Dr. Kirk. This is a very interesting subject to me, and one which I have studied from time to time. I think the idea of Dr. Watt incorrect, as it is abundantly proven that the pallor or blueness of the features is due to the replacement of the oxygen in the blood by nitrous oxide. A patient of mine, whom I took to Dr. Kimmel, was very restless while under the influence of the gas. There was no pallor of the countenance, and he said that he felt no pain; but the anesthetic was very slow in taking effect. A slight admixture of air or oxygen greatly lessens this feature of its action, while at the same time its anesthetic property is diminished. A physician of Edinburgh published, some years ago, a series of observations which he had made upon the absorption spectra of blood, and he found that the venous color was due to the absence of oxygen, and not necessarily to the presence of carbonic acid, as is often assumed; such substances as hydrogen and ammonium sulphide, for instance, being capable of deoxidizing the hæmaglobulin, giving it thedark or venous color, and the absorption spectra of blood deoxidized by these means were identical with that of blood charged with nitrous oxide. I have noticed the same discoloration of the features in a somewhat less degree during the inhalation of pure hydrogen gas, which I have administered for experimental purposes, and carried to the point of anesthesia. It is very rapid in its action, and its effects but transient. When a certain amount of air or oxygen is administered with the gas you can avoid the pallor, but it is a diffi-

cult matter to decide just how much air can be given with the gas without interfering seriously with its anesthetic quality. I do not doubt that nitrous oxide acts in the main as an asphyxiating agent; life in the lower animals, such as pigeons, rabbits, etc., can be readily extinguished in a few minutes by keeping them in an atmosphere of nitrous oxide. Its inhalation is unattended with any feeling of suffocation, because the lungs are distended with a non-irritating, respirable gas, but one which is at the same time incapable of supporting life. In the same manner, it is said, one can starve to death without experiencing the pangs of hunger by eating clay. With regard to its permanently injurious effect upon the health, I know of a gentleman who was subjected to a somewhat prolonged operation under nitrous oxide, and subsequently died of diabetes. He always attributed his ill health and the kidney disorder to the inhalation of the gas, though it may have been only a coincidence.

Dr. Tees. All the patients I have accompanied to Dr. Kimmell have been thoroughly under the influence of the gas, and have slept quietly with unchanged countenances during the operations.

Dr. Kirk. I cannot see what harm there is simply in the pallor of the features. While I had charge of the mouths of the children at the Deaf and Dumb Institution I administered the gas very frequently, and often pushed the anesthesia to a profound degree. I have noticed that the first inhalation of pure air almost instantly restored the normal color of the countenance. Immediately upon the removal of the tooth from its socket the first few drops of blood that followed would be of the dark venous color, but in a moment the color would be changed to a bright arterial hue. It is simply a physiological fact that nitrous oxide does produce pallor of the countenance. It is therefore self-evident that the more nitrous oxide you administer the more pallor you produce; and more gas can be administered through a large inhaler than a small one. I do not think that a small-sized inhaler has anything to do with the pallor of the countenance.

Dr. Darby. I have been in the habit of administering the gas for many years. Sometimes I have noticed the pallor, and sometimes I have not. I have never felt alarmed when it has been most marked. I think it is the large quantity of gas and the absence of atmosphere that produces it. If the gas be mixed with common air, a much longer time is needed to anesthetize the person, and there is a greater liability of having the patient in an excited state, and often difficult to manage. The best results are obtained when the gas is given pure and rapidly inhaled.

Dr. Noble. I think that pallor is due to an absence of oxygen in the blood, because if blood be placed in a receiver, and the air is

exhausted and oxygen introduced, the corpuscles will absorb oxygen, change their form, and become red in color. A want of color in the face indicates the condition of the patient. You can analyze the anesthetic effects by the appearance of the face, particularly of the lips.

Dr. Leffmann. The pallor of the countenance is one of the symptoms of asphyxia, and the point we would like to get at in reference to this question is, is asphyxia a necessary condition of anesthesia, or does nitrous oxide gas have an independent effect, and is the asphyxia only an accompaniment of it? If this be so, then we should so modify the gas as to get the anesthesia without the asphyxia. This is plainly so with chloroform; and Paul Bert claims that he has avoided danger from anesthesia by introducing air. If we can administer anything with this gas which will at all prevent the suffocation, and which will not diminish the insensibility to pain, we of course have an advantage. I had an idea, from some conversation with Dr. Kimmell, that his method consisted in mixing air with the gas.

Dr. Kirk. Prof. Elihu Thomson, of the Philadelphia High School, made a series of experiments some eight or ten years ago on the action of anesthetics, and I think performed the same experiment that Dr. Leffmann has just indicated. He found that a mixture of nitrous oxide and pure oxygen, in which the nitrous oxide was relatively the same as the nitrogen was to the oxygen of the atmosphere, was entirely without anesthetic effect, and apparently did not differ physiologically from ordinary air.

Dr. Chupein. I would like to hear whether Dr. Bonwill has made any further experiments in rapid breathing. Dr. Leffmann's paper touched upon that subject.

Dr. Bonwill. I was rather surprised to hear Dr. Leffmann speak of it at all, since I never claimed anything for it under the head of anesthetics. It does not belong there. I should be very happy to hear anything that he has to say on that subject.

Dr. Leffmann. I would like to say simply a word or two in justification of my position. I am pretty well assured that Dr. Bonwill did not correctly catch the phrase which I used. I used the expression analgesic effect of rapid respiration. I think that is the term which those who agree with him have preferred,—that it is not a condition of unconsciousness, or a suspension of the faculties, as anesthesia is, but a diminution of the sensibility to painful impressions. I have no clearly defined views on the subject, and I am not sure that any extended physiological explanation has been made. I only said that where an unusually rapid change of air occurs in the lungs, without allowing the air time enough to remain in the

lungs, it might produce a condition approaching asphyxia. I do not say that that *is* the effect, but I suggest whether the rapid breathing does not produce an approach to asphyxia, if the air does not remain a sufficient time in the lungs to perform its function. Possibly the physiological function requires that the air should enter the lungs and remain there for a moment or so. Now, if we increase the respiration without increasing the amount of the pulse, it may produce such a condition as I have indicated. I am merely throwing this out as a theory which suggests itself to me. I would like Dr. Bonwill to give his views on the subject. I introduced it at the end of my paper, first, because it is not a true anesthetic, and, in the second place, not having any chemical character, being physiological purely, it was rather out of the bounds of observation. Desiring to adhere more strictly to the chemical features of the subject, I simply suggested it in hopes that it would stimulate discussion. In my own case rapid breathing makes me extremely giddy, but I am made giddy very easily; using a blowpipe will produce that effect upon me. My own experiments with the method have been prevented by this unpleasant circumstance. I have no doubt that rapid respiration would interefere with some of the natural functions, and therefore diminish sensibility. We have diminished sensibility from sleep, which is a suspension of some of the natural functions, and I cannot see why we should not have it from the disturbance of other functions. At the same time, I do not see how it can be considered as true anesthesia.

Dr. Bonwill. For eight years my gasometer, holding one hundred gallons, has been idle. I gave nitrous oxide with great pleasure before I thought of rapid breathing, but since then I have used no anesthetic. Dr. Brown-Séquard informed me in 1881 that he read my article on rapid breathing, and knew there were certain physiological facts bearing on the subject, and that he illustrated it in his lectures before the students. [Dr. Bonwill related a number of cases in which he had successfully operated while the patients were under the influence of this process.] In this act the breathing is five times as fast as usual. When running one must keep up rapid respiration to maintain the proper supply of oxygen in the blood. While the ordinary pulsation is not over eighty, and in rapid breathing is not over ninety, the respiration increases from twenty to one hundred. Now, while the lungs are making one hundred respirations, and the heart maintaining its ordinary pulsations, five times the amount of oxygen is put into the blood, which, mingling with the carbon of the blood, sets free carbonic acid gas. I believe, from all that I have seen, that it is this excess of oxygen in the blood which causes the temporary insensibility to pain.

Dr. Chupein. How long must a patient breathe before this effect is produced?

Dr. Bonwill. It would be almost impossible for one taking one hundred respirations per minute to breathe over a minute or a minute and a quarter; the next minute he would hardly take two respirations, showing that there was an over-oxidation of the blood. The first clinic that I ever gave before any public body was before the class of the University of Pennsylvania. It was a complete success. To that I had the attestation of the students, dental and medical. As far as extracting teeth is concerned, the secret of success lies in the fact that, as carbonic acid gas escapes so quickly, one must operate while the patient is breathing rapidly and before he is exhausted. If five, eight, or ten seconds are lost in getting something ready, or in hunting for an instrument, the result will not be as satisfactory.

Dr. Guilford. I would like to inquire how oxidation of the blood can take place when the oxygen is breathed in and out so rapidly.

Dr. Bonwill. I gave you an illustration of that a moment ago, in the case of a man running.

Dr. Guilford. I understood Dr. Leffmann to say that, when air was breathed rapidly into and out of the lungs, it did not have time to perform its work.

Dr. Bonwill. But take the illustration I gave of a man running. There the action of the heart is quicker, in order to support the increased physical exertion. If there is not the same proportion of air going into the lungs while the heart is propelling the blood so rapidly and forcibly, what will be the result? It will produce asphyxia at once; but, as long as the man takes that amount of air into the lungs which is needed by the increased action of the heart, the increased respiration makes it all right.

Dr. Guilford. But what is it that takes place in your method of rapid respiration? Is it asphyxia?

Dr. Bonwill. No; it is the opposite of asphyxia. Asphyxia comes from a want of oxygen in the blood; this comes from an over-supply of oxygen. The secret is in the heart not pulsating in proportion with the respiration, so as to allow the heart's action to correspond with the action of the lungs.

Dr. Leffmann. I think Dr. Bonwill means that the rapid lung action introduces an overcharge of oxygen into the blood. I do not agree with him in that. I think the insensibility is due to the influence exerted upon the nerve terminals by the depression produced by the defective oxygenation of the blood.

Dr. Bonwill. But is it possible that carbonic acid gas can be set free in the blood unless there is a proper amount of air given to it?

Dr. Leffmann. I think it is possible to accumulate carbonic acid in the blood for a short time, even though no oxygen is allowed to pass in through the lungs.

Dr. Bonwill. In a person deprived of oxygen, what is the color of his skin?

Dr. Leffmann. I should think it would be the same as when nitrous oxide was inhaled.

Dr. Bonwill. It would not be red or flushed, would it?

Dr. Leffmann. No.

Dr. Bonwill. Well, that is the reverse of what you see in my operation, when carbonic acid gas is set free in the lungs, by the large amount of oxygen put into the system. You do not see the same condition of the surface of the skin as you do in asphyxia. It is a fact testified to by many that it takes a minimum quantity of ether or chloroform to affect the patient after he has breathed rapidly first. Why should that be?

Dr. Guilford. To me one of the most remarkable facts about nitrous oxide gas is that it is taken into the system as nitrous oxide gas, and is eliminated from the system without change in its character. The fact that nitrous oxide gas produces a state of insensibility does not prove that the effect is due to asphyxia. The presence of air might interfere with the functions of other agents, but when these other agents exercise their function, the asphyxia may only be incidental. Our object is to get rid of the asphyxiating effect, and obtain a physiological function. If that has been obtained, as it is now claimed to have been, I think it is by a judicious mixture of air and gas.

Dr. Tees. Dr. Leffmann has touched upon the physiological effect upon the lungs of an increased supply of air, and also upon the effect produced in laboratory work by blowing through a small pipe. I would like to ask him whether the same effect would not be produced by breathing through a small orifice, and limiting the supply of nitrous oxide gas in the lungs?

Dr. Leffmann. Yes, sir; I think it would.

Dr. Tees. At a meeting of the Odontographic Society, in 1863, when nitrous oxide was first introduced in Philadelphia, and when our college professors even were ignorant of its effects, it was made and administered for the extraction of a root; there was this bluish pallor and snoring; and fearing the operator, an eminent dentist, was allowing the gentleman to breathe too long, I advised him to remove the bag, and expostulated with him for not doing so at once, telling him that the bag was then full of carbonic acid gas. He denied this, and wished to know where it came from. I said, "From the lungs," and appealed to Prof. Morton, professor of

chemistry in the Philadelphia Dental College, for the truth of my statement. The professor agreed with me, saying, "The bag is full of it." Who was right?

Dr. Leffmann. Prof. Morton was right. The nitrous oxide gas may not form carbonic acid; but there is still carbonic acid formed in the lungs by natural process.

Dr. Tees. I think that this discussion points to the fact that the bluish pallor of the countenance shows a deleterious effect, and that the natural appearance, as seen in gentle sleep, indicates the proper condition for the patient to be in. Therefore, I suggest that the members of the society who administer nitrous oxide make it a matter of investigation, and at a future meeting give us the benefit of their experience.

Adjourned.

CONNECTICUT VALLEY DENTAL SOCIETY.

At the annual meeting of the Connecticut Valley Dental Society, held at Springfield, Mass., November 13 and 14, 1884, the following officers were elected for the ensuing year: Geo. L. Parmele, Hartford, Conn., president; S. B. Bartholomew, Springfield, Mass., first vice-president; J. N. Davenport, Northampton, Mass., second vice-president; Geo. A. Maxfield, Holyoke, Mass., secretary; A. J. Nims, Turner's Falls, Mass., assistant secretary; W. H. Jones, Northampton Mass., treasurer. C. T. Stockwell, Springfield, Mass., H. M. Miller, Westfield, Mass., J. P. Parker, Bellows Falls, Vt., executive committee.

ST. LOUIS DENTAL SOCIETY.

The annual meeting of the St. Louis Dental Society was held on Tuesday, January 6, 1885, when the following officers were elected for the ensuing year: James W. Whipple, president; A. J. Prosser, vice-president; A. H. Fuller, corresponding secretary; J. L. Foster, recording secretary; W. N. Conrad, treasurer.

A. H. Fuller, *Corresponding Secretary*,
No. 2626 Washington avenue, St. Louis, Mo.

MISSISSIPPI VALLEY ASSOCIATION OF DENTAL SURGEONS.

The forty-first annual meeting of the Mississippi Valley Association of Dental Surgeons will take place in the lecture-room of the Ohio College of Dental Surgery, Cincinnati, Ohio, at 10 o'clock A.M., on Wednesday, March 4, 1885.

A cordial invitation is extended to all members of the profession to be present.

A. Berry, *Corresponding Secretary*,
No. 95 West Seventh Street, Cincinnati, Ohio.

EDITORIAL.

RECORD OF ARTIFICIAL DENTURES.

The Connecticut Valley Dental Society is endeavoring to collect and tabulate statistics to determine the duration of the average artificial denture, and with this object in view has prepared a blank form for convenient registration of facts bearing thereon. Dr. E. A. Stebbins, Shelburne Falls, Franklin county, Mass., will send a blank form, arranged under eighteen headings, to any dentist requesting it, and willing to aid in making up the record.

BUCHANAN REDIVIVUS.

Dr. John Buchanan, the dean of the Pine-street Eclectic Medical College, Philadelphia, notorious for its traffic in fraudulent diplomas, has been again arrested on the charge that during the year 1884 he made, signed, uttered, and published written instruments purporting to be diplomas of certain medical institutions, to the prejudice of others' rights, and with intent to defraud. Robert G. Moore, a witness at the hearing, testified that Dr. Buchanan had instructed him to write the names of Drs. Gross, Pancoast, Meigs, and Pepper, and others which he did not remember, on diplomas of the Philadelphia University, Pennsylvania University, University of Pennsylvania, and Eclectic Medical College. He was committed in default of two thousand dollars' bail on the charges of conspiracy and forgery.

BIBLIOGRAPHICAL.

Modern Medical Therapeutics: A Compendium of Recent Formulæ and Specific Therapeutical Directions, from the Practice of Eminent Contemporary Physicians, American and Foreign. By George H. Napheys, A.M., M.D., etc. Edited by Joseph F. Edwards, M.D., and D. G. Brinton, M.D. Eighth edition, enlarged and revised. Octavo, pp. 629. Philadelphia: D. G. Brinton, 1885. Price, cloth, $4.00; sheep, $5.00.

The first edition of this book, published in 1870, is before us,—a little volume of less than four hundred pages, contrasting significantly with the portly volume now under notice. The fact that in the interval the eighth edition has been reached tells of its appreciation by the medical profession, and tells also of the thorough successive revisions necessary to keep it abreast of the times.

This volume is not, as might be supposed from its title, a mere list of formulæ. It takes up in order diseases of the nervous,

respiratory, circulatory, digestive, and urinary systems; diseases of the blood and toxic diseases; and, under the various necessary subheadings of each class, acquaints the reader with the exact treatment of each disease by living practitioners and teachers. The most modern methods and remedies employed by eminent physicians of several countries are thus brought together for comparison or contrast, enabling the reader to recognize the differing standpoints from which treatment is pursued, thus widening his grasp of the subject and multiplying his therapeutic resources.

Even to those not engaged in the practice of medicine as a vocation, this book would prove of great interest and value as a concise presentation of the best thoughts of the most distinguished living physicians regarding the treatment of disease. The volume gives evidence of searching revision, of judicious condensation, and of conscientious thoroughness in careful gleaning of the whole field of medical literature in its preparation. A triple index of authors, remedies, and diseases facilitates reference to any subject desired. Paper and typography are all that could be asked.

The Diagnosis and Treatment of Chronic Nasal Catarrh. By Geo. M. Lefferts, M.D. 12mo, pp. 49. St. Louis: Lambert & Co., 1885.

In this brochure Dr. Lefferts outlines the symptoms and treatment of chronic nasal catarrh, after methods accepted by many of the American laryngologists. It is a representative book, therefore, and as such is well worthy of close perusal. The style of the writer, while somewhat turgid, is that of a man of experience, who knows his subject and who is evidently conscientious. One cannot fail to be struck with the elaborate outfit demanded in these later days to successfully treat diseases of the nasal chamber. In this little book thirty figures are devoted to the illustration of instruments recommended by the author. Those in actual use by the profession which are not alluded to by him are innumerable.

The physician who confines himself to the special study of this and allied affections is in the best sense of the word a specialist.

Transactions of the Odontological Society of Pennsylvania, from its Organization, February 1, 1879, to the Close of the Year 1883. Price, cloth, $3.00.

We are in receipt of a copy of the above volume, which is an octavo of 211 pages. It contains the reports of the meetings of the society for five years, from its inception to the close of 1883. The papers read before it include some by Drs. Essig, Webb, Truman, Kirk, and others, with discussions in regular order, which are of

permanent value. A limited number of copies are for sale at the price given above, and may be obtained of the secretary. Dr. Ambler Tees, No. 548 North Seventeenth street. Philadelphia.

THE PHYSICIANS' DAILY POCKET RECORD. comprising a Visiting List. many useful Memoranda, Tables, etc. By S. W. BUTLER, M.D. Nineteenth year. New and thoroughly revised edition, with Metric Posological Table. Edited by D. G. BRINTON, M.D. Philadelphia: Office of "The Medical and Surgical Reporter," 1885. Price, for thirty and sixty patients, $1.50 and $2.00.

This Visiting List is beautifully gotten up, and its publication for nineteen successive years has enabled the publisher to incorporate the information most desired by the practitioner, and to adjust the blank pages to the best advantage. It is "perpetual" in arrangement, and may be used continuously one full year from the date of the first entry.

PAMPHLETS RECEIVED.

Caulk's Dental Annual, devoted to the Collection and Dissemination of Statistics Relating to the Business and Practice of Dentistry, 1884–85. Octavo, 66 pp. L. D. Caulk, D.D.S., editor and publisher, Camden, Del. Price, 25 cents.

Report of a Case of Interstitial Keratitis in a Subject, with probable Hereditary Syphilis. By Charles A. Oliver, M.D., one of the ophthalmic and aural surgeons to St. Mary's Hospital, Philadelphia. Reprinted from the Proceedings of the Philadelphia County Medical Society, October 15, 1884.

Closure of the Jaws and Removal of a Tumor. Two Essays delivered before the Illinois State Dental Society. By John J. R. Patrick, Belleville, Ill. Toledo, Ohio: Office "Ohio State Journal of Dental Science," 1884.

Irregularities in Human Teeth; or, Dental Teratology. An essay, by John J. R. Patrick, D.D.S., of Belleville, Ill. Read before the Illinois State Dental Society at their Twentieth Annual Session, held in Springfield on the 10th of May, 1884. Reprint from the Society's Transactions.

Home Again: A Synopsis of a Tour Abroad. By Edward Borck, A.M., M.D., of St. Louis, Mo., one of the delegates selected to represent the American Medical Association, U.S.A., Mississippi Valley Medical Society, Missouri State Medical Association, and St. Louis Medical Society, at the International Medical Congress held at Copenhagen, Denmark, from August 10–16, 1884. St. Louis: Printed by J. H. Chambers & Co., 1884.

PERISCOPE.

On Assuring Healthy Dentine over Endangered Pulps.—In saying endangered pulps, I mean cases where the pulps have but little of the natural covering of dentine in the depths of cavities, which covering is very apt to be more or less tainted by disease,—that is, by the agents that have produced caries.

Let us look at the conditions here existing. There is acid with fermentive action, often in full sway, seeming at first sight to demand the most decided and effective neutralizing and corrective applications. But, just beyond lie some of the most highly and delicately organized tissues of the whole body; fibers, that if rudely set vibrating will be likely to continue or repeat their vibrations in a very serious way; tissue, which if inflamed there is none more doubtful of survival; and we must remember that the life of the pulp means additional years of usefulness to its organ. These circumstances, I fear, are often too little considered in the use of violent or caustic applications. But what should be done? Perhaps my ideas on this point may be best given by mentioning a plan of treatment for such cases that I formed, tested, and adopted during the years 1847 and 1848, and which in its general principles I have found to be most satisfactory up to the present time. Of course, since that date new materials have been added to our list of available correctives for diseased conditions.

After first removing the loosest débris, I applied a mild antacid such as aqua calcis, or a solution of bicarbonate of soda, after thorough saturation with which I treated the cavity for the correction of fermentive elements by the application of a solution of chloride of calcium, and also very dilute creasote (we now have several substitutes for that). The cavity was then dried and sealed up for from two to three weeks, when it was opened and the *mild* saturation repeated, adding perhaps a mild astringent, such as tannic acid in weak solution, to the latter application. Then it was sealed up again, generally for a longer period, and the dressing was repeated at proper intervals until permanent health of dentine was assured.

Now, with these mild correctives we have a greater chance of avoiding undue irritation of the pulp than with stronger applications; but they will be more or less transient in their effect, and therefore will require frequent repetition, which may be less frequent as the dentine gains in soundness and health. By this method we help nature in the line of her preference,—that is, to protect rather than injure a vital point, keeping the disease in check to give her opportunity.

It may be, and has sometimes been, said that this treatment is very troublesome, and why not make one strong application and trust that nature will do the rest? I reply that the great objection is that while a strong or caustic dressing is not always lasting in corrective influence, it adds vastly to the possibilities, if it does not make sure, that the reparative action of the pulp will be interfered with, resulting in failure of the ultimate object of secondary deposit. Instances of this sort are often seen in practice; and in my obser-

vation the proportion of success of the mild repetition plan is far beyond that of the single capping practice.

Of course there will be some chance of non-success in many attempts to save the pulp, depending often on constitutional as well as local causes, and both may be obscure. The best and most promising efforts may be thwarted by neglect of the patient to report at proper times, or by interruption of the general health. Or, again, when cases are nearly ready for a permanent operation, they may be piratically appropriated by some person who very probably will speak lightly of the treatment that has brought the teeth into condition for his profitable seizure. But still our highest duty is to save life rather than to destroy or endanger it.

Representative cases might be related from a large number with various phases, but to describe them minutely would task both your time and patience. Plaster of Paris was first used as a cap for the exposed portion. Oxide of tin was also mixed with the gutta-percha.

One rather extreme case I might mention, occurring in 1854. A young man aged 25, upper left first molar having a large and deep cavity on the mesial side, with the pulp covered only very thinly by softened and disintegrated remains of dentine. But the pulp was apparently uninjured, and on inquiry I found there had been no pain, and nothing to indicate the existence of inflammation in any degree, which was an encouragement to give the pulp every chance to live and protect itself by secondary dentine. I saturated the cavity first with aqua calcis about half strength; then with solution of chloride calcium; but this causing slight sensation, I reapplied the aqua calcis with the effect of stopping pain. I then applied a *mild* non-irritating antiseptic in proportion about as follows, viz.: A wood creasote (at that time the best known antiseptic of its kind), one drop to one drachm of alcohol, adding two drachms of water, after which I dried the cavity and covered the depth over the pulp with a mixture of oxide of zinc, five parts to one of gutta-percha mixed with its bulk of yellow wax, which I placed carefully, without pressure, and filling up the cavity with the gutta-percha and oxide of zinc mixture, melting the wax. After two months I unsealed the cavity, repeated the antiseptic with the addition of a trace of tannic acid; this at first caused sensation, which was readily dispelled by aqua calcis. I then dried and sealed up the cavity; at the end of four months repeating the above treatment, twice again after six months, and finally after about eight months, making more than two years in all, when there was a firm, hard, almost transparent floor of new dentine, from which the former disintegrated material was readily brushed off by a light touch of an instrument. After placing an inert non-conducting material (a piece of fine white silk saturated with wax) at the depth of the cavity, I filled with gold. Two years afterwards a small cavity occurred on the distal side of the same tooth, which on preparing to fill I found as sensitive to the instrument as if it had been the first cavity the tooth ever had, proving the unimpaired vitality of the organ, which continued several years after and during the life of the patient.—*Dr. Jacob L. Williams, before Section on Oral and Dental Surgery, American Medical Association, in Jour. American Med. Association.*

Treatment of Fracture of the Inferior Maxilla.—The most common site for fracture of the lower jaw was close to the canine tooth, for the bone narrowed somewhat at that point, and the depth of the socket of that tooth tended still further to weaken it; the next most common seats of fracture were through the angle and through the neck of the condyle. Multiple fractures were very common, and the existence of a second or third fracture should only be negatived after careful search. It was chiefly in the treatment of the more complicated cases that the aid of the dental surgeon was sought. Three-fourths of the cases of fracture of the jaw would get well under any simple treatment, and very few of these came under the notice of the dental surgeon. At Guy's Hospital, Mr. Bryant used for such cases a splint made of several thicknesses of plaster of Paris bandage, accurately molded to the outer surface of the chin and jaw, and fixed by means of a four-tailed bandage. This splint was light, efficient, and easy of application, but he thought the modification of Hammond's splint, which he would describe, would be pleasanter for the patient, and would give equally good results. Mr. Pedley then described the ordinary Hammond's splint. This was only required where there were multiple fractures, or where there was obstinate displacement. The first step in the preparation of the splint was the taking of models of the upper and lower jaws, and this was in severe cases no easy matter, even to a dentist. Then casts had to be obtained from these models. That at the lower jaw might have to be sawn across at the point of fracture, and the fragments adjusted to their proper positions. A loop of wire is then framed on the corrected model of the lower jaw, passing behind the last tooth on each side, and accurately fitting the necks of the teeth at the margin of the gums. The wire collar thus prepared is slipped over the teeth of the fractured jaw by reducing the displacement, and is secured to the teeth by means of binding wire passed between each tooth. In the modification of this splint in use at Guy's the necessity for model-taking and soldering was dispensed with; it was especially applicable when the fracture was situated anteriorly, and the displacement was not very marked. Instead of the main wire passing behind the last tooth on each side, it was passed between the bicuspids or any teeth posterior to them. The point of the wire was passed between the teeth on one side, across the tongue, and between the corresponding teeth on the other side. The portion of the wire lying on the tongue was then bent against the necks of the teeth on the lingual aspect; binding wire was next passed between all the teeth opposite which the main wire lay, except those contiguous to the fracture, and the loops tightened up in the usual way. The ends of the main wire were either twisted together, or passed through a small piece of closely-fitting metal tubing, bent over in opposite directions and cut off short. This was the better plan, as there was less chance of displacing the fragments. The patient can now open and close the jaws without pain or risk of injury. The splint should be worn for six weeks, or longer if necessary. In cases where firmly implanted teeth do not exist in each fragment of the fractured bone, Hammond's splint was not applicable, and some other form, such as Gunning's, must be used; but for all cases in which it could be applied it was as efficient as

and far less irksome to the patient than any hitherto invented. In conclusion, Mr. Pedley referred to the use of Hammond's splint in cases of surgical division of the jaw for the purpose of facilitating operations on the tongue or floor of the mouth. In such cases it was a good plan, instead of sawing the bone through vertically, to make two oblique cuts, meeting at an angle. In this way the ends of the bone lock into one another and maintain their position more readily.—*F. N. Pedley, M.R.C.S., before Odontological Soc. of Great Britain, in Med. Press.*

The Bacilli of the Mouth.—No more fertile source for bacteria, available to all who care to study them, can be found than the cavity of the mouth. W. D. Miller states, in the *Deutsche Med. Wochenschrift* for November 27, that if a sharp instrument be introduced between the gum and a tooth, especially if the former be from any cause slightly hyperæmic, the scrapings thus obtained leave nothing to be desired in the way of curved bacilli and spirochætæ.

In the first place, there is a comma-bacillus resembling that of cholera, but which Koch has shown to be altogether distinct. No efforts to cultivate it have as yet succeeded. A second fungus, less difficult to cultivate, is a short, plump, somewhat pointed bacterium, of which two are often united at an acute angle. The latter especially occur with rods which are in a state of fission. The fungus is mobile, growing very rapidly at the temperature of the room, and liquefies gelatine to a considerable extent. A third fungus is also a delicate rod, either straight or more or less curved, sometimes to the extent of a semi-circle, so that two placed appropriately produce an O-shaped figure, and sometimes the rodlets are so rolled together that they can scarcely be distinguished from coccospheres. By fission they form coccochains, best seen in old cultures. In these Miller has found neither spore formation nor motion. They are very slow and difficult of culture on gelatine, but do not cause a liquefaction of this substance. Hence, it differs in this respect from the cholera fungus.

Miller has also found in the mouth fungi which are not destroyed by an artificial gastric juice, and these may pass through the stomach into the intestine, and there undergo further development. This may be true of these curved bacilli described, since he has found in his own feces undoubted curved bacilli, especially accompanying a slight diarrhea. But these were as difficult of culture as the curved bacilli found in the mouth. Whence we may infer that the fact of a bacillus being curved is no criterion of its specificity, and that bacteria of this shape occur which have no closer relation to each other than the different bacteria which are found in the shape of cocci. Much more accurate information may, however, be expected from carefully conducted culture experiments.—*Medical News.*

Syrup of Dentition.—A compound, with the above as a title, is being ordered of the apothecaries of this city, by prescription. Ordering by title alone generally finds the dispenser unfamiliar with this class of preparations. In the absence of other accessible

means it is, of course, only by application to the prescriber or to some druggist who may happen to possess it, that the dispenser can procure the formula. It is proper that as soon as such recipes come into vogue or use they should become, through publication, common property, to the end that all may have equal opportunity.

The writer, on procuring the formula, and being under the impression that it was original in the French Codex, applied to Professor Maisch, who, after examination, very kindly gave the following information:

Dorvault's l'Officine (but not the French Codex) contains the recipe under the name of "Sirop de Dentition de Delabarre," with a formula very similar to that you gave me, as follows:

℞.	Juice of fresh tamarinds,	3 gm.
	Infusion of saffron (strength 3 per cent.),	2 "
	Purified honey,	10 "
	Tincture of vanilla,	25 "

Dorvault says, in a note appended, "The juice of tamarinds may be replaced by the pulp diffused in water" (proportions not given), the fresh juice, of course, not being obtainable.

There being, as will be observed, considerable obscurity in regard to proportion of ingredients in the components of the above, something will have to be assumed by individual judgment in working out an acceptable and nice compound. The preparation will be assigned, naturally, a place among the fanciful, but will attract the attention of the younger members of the medical fraternity by its novelty. The elders, we imagine, will want it but seldom, unless it can be demonstrated that it has something of utility in it. As a placebo it may divert the infant by sweetening the coming tooth, but that it will assuage or mitigate the pain of that sometimes painful process, dentition (if that be the purpose and intention of the preparation), readers will pardon the writer for doubting.—*W. B. Thompson, in American Journal of Pharmacy.*

Specialism.—Dr. L. Duncan Bulkley read a paper before the American Academy of Medicine, August, 1884, which was published in the *Journal of the American Medical Association* for December 13, discussing the relations which those who are practicing and advancing medicine should bear toward the development of its science and art, by developing the separate or special portions of that science and art. The author considers the subject under the headings of, first, specialties, what they are; second, why they exist; third, the relations they bear to the progress of medicine; fourth, the relations they bear to general medical practice; fifth, specialists, or those limiting their practice to a single branch of medicine or class of diseases; sixth, the education necessary for the proper practice of a specialty; seventh, the future of medical specialism. In conclusion, the writer briefly sums up the matters presented in the paper as follows:

1. The science and practice of medicine has, in company with

other sciences, become so vast that no one mind is capable of fully grasping every portion of it. 2. Unconsciously its various departments have become divided up, and from natural causes certain men have become prominent in various departments. 3. These so-called specialties in medicine are so great and extensive each, that particular or exclusive attention is now devoted to them, the study and practice in each branch being sufficient to fully occupy one's time. 4. The development of these branches has greatly increased the scope and extent of medical knowledge. 5. Every medical practitioner should be more or less of a specialist, excelling in some particular direction. 6. To properly follow and develop one of these specialties, the medical man should be particularly well educated, theoretically and practically, in general medicine as well as in his special branch. 7. This tendency to specialism in medicine cannot be arrested; but the difficulty tends to solve itself, by the education of practitioners and students in these specialties, so that the majority of simpler cases shall be treated by them, while the more difficult and obscure cases will naturally fall to the specialist who refuses to treat other diseases and confines himself to the practice of a single branch.

Chloroform in Tic Douloureux.—Bartholow, in presenting a case of tic douloureux to his class, proceeds to make the following remarks on the treatment of this intractable disorder: "There is no fact in therapeutics more striking than the curative effects of a few drops of chloroform injected in the neighborhood of this division of the nerve (the superior maxillary branch of the fifth cranial nerve) when the seat of neuralgia. It is this division which is most frequently affected, and fortunately so, for it is this division which is most easily reached by the following method of treatment: Given a case of tic douloureux involving this nerve, lift the corner of the lip and insert a hypodermic needle at the junction of the mucous membrane of the lip and that of the cavity of the mouth; pass it up till its extremity comes in the neighborhood of the nerve, and inject from five to fifteen minims of chloroform or ether, the former the most efficient. In the majority of cases there is immediate relief from pain, which, if not permanent, lasts a considerable time. I have a patient in Boston who comes to me twice a year to have this injection practiced. In his case no other measures have answered. The relief which he obtains is complete, and lasts never less than six months."—*Buffalo Medical and Surgical Journal.*

Facts and their Appreciation.—The tendency has been too great of late years, doubtless from the backward swing of the pendulum away from the old times of authority, to subordinate the reasoning powers to the mere observation of physical processes. It is equivalent to saying—as the vulgar are very much given to saying—that nobody is qualified to criticise a picture unless he can paint a better one himself. We are far from underrating the great debt that modern medicine owes to pure observation; indeed, we are quite in accord with the feeling that, just at this juncture, competent observation is the chief thing needed to advance our art. But we may be allowed to add that it is not the only thing needed.

Blocks of stone may be carved with the greatest nicety, but the real work of constructing an edifice is done by him whose hands are entirely unused to the actual play of tools. The parallel must be reversed, it is true, for in material building it is the architect's conception that must precede the mechanical work, while in science the preparation of materials has to go before the constructive process; but the deduction remains obvious that the greatest service is rendered not by him who digs out facts, but by him who welds them together. We must, therefore, deprecate the infatuation which honors only the discoverer and gives the cold shoulder to the critic.—*New York Medical Journal.*

Removable Teeth.—At the last meeting of the Odontological Society of Great Britain, Mr. Willoughby Weiss related the following remarkable case of salivary calculus surrounding the three lower incisors, and showed a model of the mouth. The patient, a woman, first came to him in April, 1881; her mouth was in a very dirty and neglected state; there was a good deal of tartar about the teeth, but especially about the root of the lower left central incisor, which was entirely surrounded by the deposit. The tooth was loose, and could be removed and replaced by the finger. She refused to have anything done, and was not seen again until June, 1882, when the right central incisor was found to be affected in the same way. She again refused to submit to any treatment, and disappeared until July, 1883, when the left lateral incisor was found to be similarly affected. During this time she had suffered no pain, and was able to masticate fairly, although all three teeth could be removed and replanted at will. About January, 1884, the gums began to be tender, and about the beginning of May she had to take out the loose teeth while eating, replacing them afterwards, because, as she said, their absence affected her speech. At last, in July, 1884, she allowed Mr. Weiss to remove the three teeth, together with the right lateral incisor, which was becoming loose, and an artificial denture was fitted. The peculiarity of the case was not the amount of the tartar, but the way in which it was deposited around each tooth, so that each one, as it were, locked its neighbor in its place.—*British Med. Jour.*

Tearing of the Dental Nerves in Persistent Neuralgia.—M. Monod has successfully treated two cases of obstinate dental neuralgia by tearing the extremity of the dental nerve. The first patient has remained perfectly free from pain during thirteen months. M. Monod trephined the ramus of the inferior maxilla by Warren's process; neuralgia reappeared at the end of six months, and was localized at the mental foramen. M. Monod then trephined the bone behind the mental foramen, adopting Jules Roux's process; the nerve was then torn, and the patient was rapidly cured. The second patient was treated in the same way; hitherto successful; but the operation is too recent to pronounce it a positive cure. Stretching the inferior dental nerve has been proved successful in one case only, by M. Mark Sée. Tearing the nerve has resulted in cure in thirteen cases. The same operation has been performed on the infraorbital nerve with satisfactory results. —*British Medical Journal.*

Gouty Teeth.—Dr. Saundby showed a patient, the subject of chronic constitutional gout, and also plaster-casts, to illustrate the type of teeth seen in gouty persons, where these structures are worn down so as to be very little above the surface of the gum. He regarded this peculiarity as quite characteristic, and of great diagnostic value in many cases of obscure disease, depending upon the gouty diathesis. He referred to a recent statement by Dr. Dyce Duckworth, that, out of one hundred typical cases of gout examined by him, the teeth were sound and well formed, and expressed his dissent from the general accuracy of the conclusion drawn from that observation.—*British Med. Journal.*

Facial Neuralgia Treated by Nerve Vibration.—Dr. William H. Neale, of London, reports a case of severe facial neuralgia successfully treated by nerve vibration, or percussion. He used the small, flat ivory disk, with about ninety vibrations to the second, applying it to the primary seat of pain. After an application of about eight minutes the pain at that point had entirely disappeared. The disk was then moved until another painful spot was found, and the percussion again performed. Each day the painful points were sought out and percussed until the patient entirely recovered.—*Practitioner.*

To Cure an Abscess without a Cicatrix.—Dr. Quinlan uses a silver wire, passed through the abscess before it has reached the skin, and retained there. It acts as a drain, he says, and has never failed in his hands.—*Med. and Surg. Reporter.*

Sub-Mucous Injections of Chloroform.—M. Gaspard Guillot contributes his personal observations on this subject in a letter to the *Progrès Medical.* He recommends the treatment in cases of obstinate dental neuralgia and alveolar abscess. Two or three drops should usually be injected at a time. The writer refers to the extensive experience of Dr. Doss, who has given a large number of the injections with perfect success. The pain was quickly subdued, and no bad results followed.—*New York Medical Journal.*

Japanese Teeth.—At the last meeting of the Odontological Society of Great Britain, Dr. St. George Elliott exhibited and presented to the museum some very curious artificial dentures of Japanese manufacture. These people had derived most of their technical and scientific knowledge from the Chinese, but in this matter they were far in advance of their teachers; for whilst the latter could only carve a row of incisors and fasten them to the teeth on either side, the Japanese could make thoroughly serviceable dentures, and had been acquainted with the fixing of dentures by suction for about two hundred years. The exhibited teeth were mounted on hard wood; the front teeth were made from quartz pebbles, carefully ground down, but the process of mastication was performed by copper nails, which occupied the place of the molars. One of these dentures had been in use for fifteen years. Dr. Elliott gave a very interesting account of the way in which they were made and fitted, which caused considerable wonderment at the ingenuity displayed.—*Medical Press.*

HINTS AND QUERIES.

I TAKE the liberty of submitting the following personal experience in the use of the muriate of cocaïne, hypodermically applied, upon the dental branch of the third division of the fifth cranial nerve. The injection was attempted over the nerve where it enters the dental foramen, on the internal surface of the ramus of the inferior maxilla, on the *left* side. The introduction of the solution (a four per cent. preparation of Foucar's) was made by Dr. Frank Hartley, of Roosevelt Hospital, this city, and was accomplished by his first feeling with the finger for the prominent spine that guards the opening of the dental foramen, and inserting the needle point at the place thus indicated. Twelve minims was first injected, a drop of the solution being impelled ahead of the needle as it was pushed through the mucous membrane, thus rendering its introduction painless.

The results that ensued, although not exactly of the character sought, were yet marked and of interest. Cerebral effects were soon manifest in considerable excitation of the mind, and a pleasurable degree of warmth was experienced. Upon lancing the gums on the left side, in three or four minutes it was noticed that sensibility of the membrane was almost entirely absent on the lingual aspect, and more slightly so on the buccal; the lower lip was also somewhat benumbed. Simultaneously with these phenomena the right side of my tongue became stiff and numb; swallowing was accomplished with effort, and the sense of taste on the left side almost completely lost, proving that our injection had taken effect on the *lingual* more than on the *dental* branch.

At the end of ten minutes twelve minims more was introduced at the same place, with the result only of accentuating the afore-mentioned action of the drug. Delay in the prompt sequence of ideas now became a pronounced symptom, and although the articulate character of speech was in no sense affected, I was frequently obliged to stop a moment or so and think for the next word in delivering myself of the simplest thoughts. At this juncture Dr. J. S. Converse, of West Thirty-seventh street, attempted the removal of an offending wisdom tooth in the left side below, but as soon as he commenced traction I called to him to desist, as it pained.

Our experiment was not a success, therefore, as regards the anesthetizing of the inferior dental nerve in this instance, but quite so as respects the lingual branch. By a curved hypodermic needle which I have made, I trust, however, to achieve better results, by *pulling* the point into the dental foramen, thereby delivering the contents of my syringe upon the dental nerve alone, avoiding the lingual and mylohyoid branches, which are given off just behind the dental foramen. I have deemed this as yet incomplete effort to anesthetize the inferior dental nerve sufficiently important to record, in hopes that others may be incited, in common with myself, to push this matter to further issues.

Later.—As an addendum, I will furthermore say that Dr. Hartley, to whom I gave one of the curved hypodermic needles which I made, reports complete success in its use at Roosevelt, having succeeded in extracting teeth and performing other usually painful operations with complete absence of pain.—J. H. MARTINDALE, D.D.S., *New York City.*

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ORIGINAL COMMUNICATIONS.

MOLECULAR STRUCTURE AND FORCE WITH REFERENCE TO NUTRITION.

BY J. L. WILLIAMS, D.D.S., NEW HAVEN, CONN.

(Read before the First District Dental Society, State of New York, January 6, 1885.)

Mr. President and Gentlemen of the Society: I am sure you will rightly apprehend me when I say that the daily routine of details which goes to make up the practice of our specialty is not calculated to foster in us that spirit of broad and liberal thinking which is the essence of true scientific culture, and that it is therefore good for us to occasionally go back to a consideration of those first principles which are the foundations of all specialties. And more than this, if our minds are at times drawn away from the matters about which our thoughts concentrate so persistently that different forms of gold and the methods of condensing it in the cavities of carious teeth, and the best methods of filling the canals of pulpless teeth and treating pyorrhea alveolaris, become inwoven into our very spiritual faculties (pardon the unscientific allusion), we shall go back to our work with pleasant thoughts that after all the universe contains something more than artificial teeth and decayed molars.

I sometimes think it would be good for our sober brethren, the ministers, as well as their hearers, if they would occasionally announce that they would preach a sermon on the recent decline in stocks, or the Keely motor, or the relation of the moon to tidal movements, or some other subject, which might act as a sort of mental alterative. Emerson uttered the sentiments of more than one thinking man when he replied, on being asked why he did not go to church, "Why should I? Do I not know when the preacher announces his text just what he is going to say?" But I selected the text which I have announced, not so much in the belief that I

should be able to say anything new as in the hope that I might present certain truths already known in a new light. The apprehension of truth in the mind is so like a glimpse through a kaleidoscope —a little movement causing the brilliant, crystal-like masses to fall into new and perhaps more admirable positions—that a slight rearrangement of well-known facts into a new synthetic relation often gives us a more satisfactory knowledge of the subject under investigation.

The problem which presents itself to one undertaking in the brief period of time allowed me the presentation of a theme which involves directly or indirectly all that is known of the material manifestation of that which we call *life*, arises from the difficulty of isolating a few strong, salient truths, and so arranging and elucidating those truths as to make them provocative of newer and better reasoning upon the subject.

The term nutrition in its broadest interpretation involves the study of the changes through which the elementary forms of matter pass to those complex relations which they sustain in the higher forms of organic existence. From a chemical stand-point, these changes are the immediate results of the action or interaction of molecular force,—the force in obedience to which the atoms of the elementary forms of matter unite to form molecules of chemical combinations or substances. As we have always to keep in mind the presence and operation of this force in considering the phenomena of nutrition, it may be well to study a little in detail some of its simpler manifestations. You are all familiar with the well-known facts of that special exhibition of electric force known as magnetism. You know that if two bar magnets are suspended by strings, in close proximity, they exhibit a mutual attraction for each other. If the end of one of the magnets is reversed, the force manifests itself as repulsion instead of attraction. So we say that one half of the magnet repels and the other half attracts. If we divide the magnet exactly in the middle, we find that each half now possesses the same characteristic qualities which the original magnet did before dividing it. And this fact remains true of all the pieces into which it is possible for us to divide the magnet. When the experimental evidence fails us, we may, in imagination, pass beyond its boundary, and discern this same force of polarity in every molecule of iron of which the magnet is composed. Now, structural arrangement, whether in the diamond, in the petals of the rose, or in the tissues of the human organism, is possible because there is manifested in every atom of matter a force akin to the polar force of the magnet. So powerful is this force that we know it is hardly possible for most forms of matter to remain in an elementary condition for any length

of time. We have seen that our magnet exhibits two poles, but we find that the atoms of the different elements are not all like our magnet or like each other in this respect. The atom of hydrogen, for instance, has but one pole or a combining power of one. Oxygen has two. An atom of oxygen will therefore attract and hold two atoms of hydrogen, and so in speaking of water in the language of chemistry we say H_2O.

Carbon has a quantivalence, or *quantivalens* (from *quantitas*, quantity, and *valens*, being worth), meaning its combining power or worth, of four. Sulphur combines with two, three, four, and six atoms of other elements, and many others possess this power of combining in different proportions. These are but simple, well-known facts of chemistry. I mention them to remind you that this molecular force, or combining power of atoms, in its various manifestations, is the Alpha and Omega of all inorganic and organic growth, and therefore of nutrition. The most comprehensive definition of nutrition ever given, and one which may be called an ultimate definition, is *the satisfying of bonds of affinity*. These affinities are awakened or brought into an active condition by phenomena *usually* spoken of as the constant conversion of the force of an organism into labor, which force is said to be liberated by the decomposition or oxidation of certain nutritive elements. Action or motion in some form seems to be the end sought in every form of existence. To maintain the organism by supplying substances in such forms as may be appropriated in place of those whose values have been converted into motion or labor, or cancelled, or for the purpose of storing up chemical compounds in such forms as may be readily appropriated when needed, either for the support of the organism in which is effected their formation or for others remote in space and character, is the function of nutrition. Whether a given substance may become the food of an organism or not depends, first, upon the demands of the organism for something which the substance in question contains, and, second, the power of the organism to overcome the bonds of affinity in which the elements or molecules of the substance is held, both for the purpose of utilizing what is needed for actual work in the organism and the disposal of the residue which is not needed.

It is thus seen that the wider the range of activities of an organism, the more complex must be the arrangement of its parts, both for the actual performance of the labor and the maintenance of the parts in the proper condition for labor. We shall probably obtain a clearer knowledge of the operation of molecular force as exhibited in nutrition if our studies begin with the simpler combinations. From a chemical stand-point, there is no arbitrary

line separating the so-called inorganic from the organic. On its material side life is *one*, not only from monad to man, but from the simplest form of crystal to man. We begin the study of mathematics by counting our fingers. We may at length determine the parallax of distant stars, or measure the height of the mountains of the moon, but the same simple, fundamental principles of mathematics run through all the most intricate problems. So, all the phenomena of the nutrition of the human body may be reduced to simple expressions of chemical equations.

Let us first inquire, then, how a crystal, the simplest visible structural form in which the atoms of elements unite, is built up. We have seen that the atoms of all elementary substances are polar, each having a definite number of points or poles of attraction. We speak of the union of the atoms of *elementary* substances, but the truth probably is, that even in elementary substances atoms are united in the form of molecules soon after liberation. It is known that an elementary substance just liberated from union unites with much greater intensity than it does after remaining for a time in an isolated state, the reason probably being that the affinity of its atoms is to some extent satisfied by their uniting with one another.

Probably most of you have, as boys, breathed upon a pane of glass during a cold winter's day, until you had melted the ice covering it, and then watched the fern-like crystal formations shoot out from the edges of your miniature pond and meet in the center. It is a beautiful exhibition, and one which may always be watched with feelings of wonder, admiration, and, I may say, awe; for are we not very near to the energies which have brought the present universe of worlds out of chaos?

Water crystallizes in many beautiful forms, but these forms are all variations of one typical form, which is six-sided or six-rayed; so the nucleal particle upon which they are built must consist of three or six molecules combined. And we know that the molecule of water consists of three atoms, or probably molecules,—two of hydrogen and one of oxygen. Thus we see that the points of polarity of a molecule determine the form in which an aggregation of the molecules will appear as a crystalline mass, if no disturbing or opposing force is permitted to act upon them. By virtue of their poles of attraction and repulsion, the atoms are drawn together, and into definite shapes, and silently and symmetrically the most exquisite structures are built up.

If we send a mild current of electricity through a solution of acetate of lead, the lead is liberated from its union with acetic acid, and the metallic atoms unite with each other and grow into fern-like forms of as marvelous beauty as any of the products of the

so-called organic forces. And the difference of conditions governing the formation of our inorganic lead ferns from those under which the organic vegetable fern is developed are not so entirely different and remote as you might at first think.

In the formation of the metallic fern we have the material suspended in the transparent solution of the acetate of lead. The material from which our vegetable fern is built up is also suspended in the atmosphere as one of the forms resulting from the union of carbon and oxygen. The electric current liberates, or furnishes the initiative for liberating, the acetic acid, leaving the atoms of lead free to obey the impulse of their affinities, and they unite and grow into beautiful forms. In the leaves of the vegetable fern the sunlight, a force akin to electricity, liberates the oxygen from the carbonic acid and aqueous vapor, and leaves the carbon and hydrogen free to unite in the building up of the plant. In both instances the molecular attractions find expression in similar forms, and the substances are acted upon by similar forces in a similar manner.

By a very ingenious calculation, based upon the decomposition of light in the film of a soap-bubble, Sir Wm. Thompson estimates the diameter of a molecule of water to be not far from $\frac{1}{500,000,000}$ of an inch. Not only is the molecule a definite mass which may be measured, but it can also be weighed. The unit of molecular weight is the microcrith, which is the weight of the hydrogen half-molecule. A single molecule of oxygen, therefore, weighs 32 microcriths; one of nitrogen, 28; and one of chlorine, 71. Now, if you have well fixed in your minds the truth that a molecule is a mass of matter of definite size and weight, composed of atoms possessing one or more poles of attraction, by means of which they unite, let us study a little the structure of the molecules of a few substances. You have here ("The New Chemistry," Cooke, p. 242) a table showing the poles of attraction of some of the elements. These marks indicate the poles, combining power, or quantivalence of the atoms. The number is not invariably fixed in all of them; for instance, we see that $-\overset{|}{\underset{|}{N}}$ is placed in the column of those elements having three poles, but in some combinations N is known to have five poles.

$$H-\overset{H}{\underset{H}{\overset{|}{\underset{|}{N}}}}$$

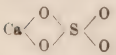
This diagram shows the construction of a molecule of ammonia gas. Each of the three poles of the N has united with the single pole of an atom of H.

$$\begin{matrix} & H & \\ & | & \\ {}^{H}_{H} & N & -Cl \\ & | & \\ & H & \end{matrix}$$

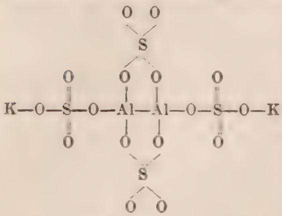
The second diagram shows N with five poles, four of which have united with H, and the remaining pole with Cl to form ammonic chloride.

But these exceptions are circumscribed by limits which are easily defined. In all compounds, it is supposed that the atom having

the highest or strongest quantivalence, or largest number of poles, takes a position in the center. In complex molecules there are sometimes several centers, around which the other atoms are grouped, much as some of the irregular bones are developed from several centers; in fact, as we shall see a little further on, certain atoms, or combinations of atoms, do really serve as a kind of skeleton for the building up of the molecule.



In this diagram it will be seen that the atom of S, which is sexivalent, or has six poles,* occupies the center, and holds the atoms together, forming a molecule of calcic sulphate.



Here, in the next diagram, we have a very complex molecule. You will observe that two atoms of aluminum with their four poles each form the center of the group. There are also four secondary centers formed by the four atoms of sulphur, to the poles of which are united atoms of oxygen, and to the oxygen two atoms of potassium, the whole forming a molecule of potassic-aluminic sulphate,† or alum. Not only are atoms endowed with poles of attraction, but the poles, as I have already remarked, are electro-positive and electro-negative, as shown by that interchange or substitution of atoms, known in chemistry as metathesis.

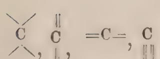
The radicals of the alkalies have been found to be electro-positive, while the radicals of the acids are electro-negative. Again, our magnet furnishes a beautiful illustration of the manner in which these electro-negative and electro-positive atoms act. If a soft iron bar is brought in contact with a powerful magnetic pole, we find that the two ends of the bar become strongly polar, the end furthest from the pole of the magnet having the same electrical condition as the active pole of the magnet. Now, if we place a lump of nickel at the free end of the iron bar, it becomes magnetized and adheres to the bar. Let us suppose that this lump of nickel is as large as the iron is capable of magnetizing or holding. If we now bring near the pole of the bar which is holding the nickel a piece of soft iron, the bar drops the nickel and takes the iron. This simple experiment forms a striking illustration of the manner in which atoms are often substituted for other atoms in the construction of molecules.

* In a few of these diagrams the printer has been unable to represent the full number of poles or combining powers of the atoms.

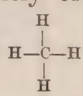
† It is to be understood that the arrangement of these diagrams is entirely hypothetical, and of value only to the extent to which they assist us in comprehending molecular structure and chemical changes.

Suppose we have an atom of oxygen, O, with its two poles. An atom of potassium, K, which is a strong, positive radical, is brought in contact with one pole of the oxygen atom. The opposite pole of this oxygen atom is then rendered strongly positive, and attracts the negative atom of H, forming a molecule of potassic hydrate. But the H being a somewhat indifferent element, is not held in very secure bonds. If a radical like NO_2, the radical of nitric acid, which is capable of receiving a greater degree of polarity, is brought in contact with this molecule, it drops the H and takes the radical, just as our magnet gave up the nickel for the iron. Passing over much that is interesting in this connection, let us turn to the extensive group of carbon compounds, which constitute what is known as organic chemistry, and which is more intimately connected with our subject.

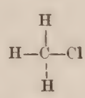
The term nutrition, as applied to the formation and growth of vegetables, may be said to be synonymous with the formation of these carbon compounds. We have seen that the carbon atom has four poles of attraction, which may be variously represented, as



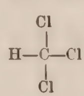
shown by these diagrams. Suppose we satisfy or close the four bonds of a carbon atom thus,



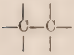
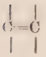
with four univalent hydrogen atoms. We have a molecule of the gas commonly known as marsh-gas, or fire-damp, the chemical name of which is methyl hydride, or methane. If, now, we substitute an atom of the univalent element Cl for one atom of the H, we have:

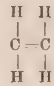


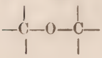
$C\,H_3\,Cl$, a molecule of methyl chloride, or mono-chlor-methane. If we take away three of the hydrogen atoms and supply their places with three atoms of chlorine, we have:

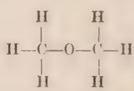


$C\,H\,Cl_3$, a molecule of trichlor-methane, or chloroform. There is a large group of these compounds founded upon this single atom of C, with its four poles, and known as the methane group. We also find that the carbon atoms unite with each other to form what are called radicals having from one to twenty or more poles of attraction, and each of these radicals is the skeleton, center, or nucleus of a large group of compounds. I have already given you illustrations of the methane, or C_1, group. The C_2 group is the

radical of the ethane compounds, which are hydro-carbons, shown  by this diagram. You will observe that two of the bonds unite with each other, leaving six exposed. If we satisfy these six bonds with six atoms of hydrogen, we have ethane, or dimethyl. If we unite the carbon atoms by two of their bonds thus,  and satisfy those four exposed poles with four hydrogen atoms, we have a molecule:

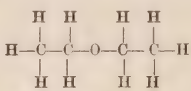


$C_2 H_4$, of the colorless, poisonous ethylene, or olefiant gas. If we interpose an atom of oxygen, which has two poles, between the two  atoms of carbon, thus, and then give the six poles of the radical each an atom of hydrogen, we shall have a molecule,

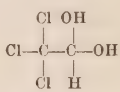


$C_2 H_6 O$, of ethyl alcohol, common alcohol, or spirit of wine.

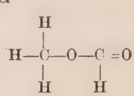
If, now, we take a molecule of ethane, or dimethyl, and remove one of the hydrogen atoms and give the pole an oxygen atom, and to the exposed pole of the oxygen atom, we give another C_2 group, with five hydrogen atoms at its exposed poles, or, in other words, if we simply take two molecules of ethane, and removing one hydrogen atom from each, unite the two by an atom of oxygen, we shall have a molecule of



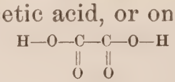
$C_4 H_{10} O$ sulphuric ether, or ethyl oxide. If we remove all of the hydrogen atoms except one from a C_2 group, and give three of the poles three atoms of chlorine, and the remaining two each a hydroxyl group thus:



$C_2 H Cl_3 O + H_2 O$, we have a molecule of chloral hydrate. On this same C radical we may build



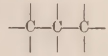
$C_2 H_4 O_2$, a molecule of acetic acid, or one of

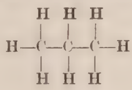


$C_2 H_2 O_4$, oxalic acid.

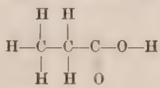
We have now built on this simple group, or radical C_2, molecules

of ethane, olefiant gas, alcohol, sulphuric ether, chloral hydrate, acetic and oxalic acids. I have presented quite a number of radically different substances from this group, to show how wonderfully simple and orderly is this process of building molecules when we have obtained the key of interpretation. This key is the carbon radical and the law of the substitution of atoms by the action of a force akin to magnetism or electricity. The type of the hydro-carbon group, which has three atoms of carbon, thus, for its radical, or skeleton, is propane, shown in this diagram,



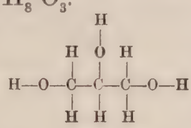


formed by joining eight univalent carbon atoms to the eight exposed poles of the carbon group. This is a large group, but I shall mention only a few of the more familiar, or well-known numbers. If we remove three of the hydrogen atoms from this group, and substitute for them one atom of oxygen and a hydroxyl group thus:

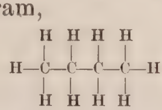


we shall have a molecule of propionic acid, $C_3 H_6 O_2$, a substance found in sweat, the fluids of the stomach, and the blossoms of milfoil.

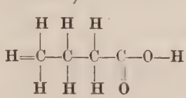
If we remove three hydrogen atoms from a molecule of propane and substitute for them three hydroxyl groups thus, it gives us a molecule of glycerine, $C_3 H_8 O_3$.



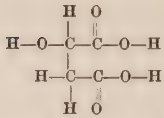
In the C_4 group, or butane compounds, the typal molecule of which is represented in this diagram,



($C_4 H_{10}$, *butane*), we find the well-known butyric acid, too well known when we find it in rancid butter,

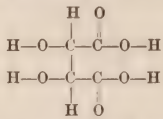


($C_4 H_8 O_2$), in which three of the hydrogen atoms are replaced by an atom of oxygen and a hydroxyl group; also, malic acid, found in apples, gooseberries, and other sour fruits. In the molecule of this substance the relation of the four carbon atoms which form the radical is changed somewhat, as shown in this diagram:



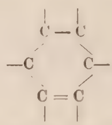
(*$C_4 H_6 O_5$, malic acid*). It may be formed in nature by the breaking up of 4 eq. of CO_2, and 3 eq. of $H_2 O$, with the liberation of 6 eq. of O.

Tartaric acid, which also occurs in many fruits, is also found in this group. Its molecule is shown in this diagram

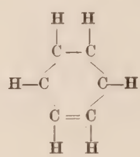


(*$C_4 H_6 O_6$, tartaric acid*). It may be formed by the breaking up of 4 eq. of $C O_2$, and 3 eq. of $H_2 O$, with the liberation of 5 eq. of O.

Sometimes the carbon atoms which form the radical of these compounds unite by more of their poles than are necessary to form a simple union. This, of course, diminishes the number of poles exposed. We have an illustration of this in the C_6, or group of hexane compounds, the radical of which is shown in this diagram,

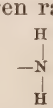


and which has but six bonds that are not united. If we close these six poles with six atoms of hydrogen, we have a molecule of the hydro-carbon, benzol.

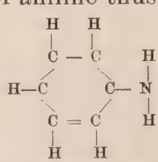


(*$C_6 H_6$, benzol.*)

If we remove one of the hydrogen atoms from this molecule and close this pole with the amidogen radical

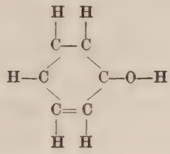


we shall have a molecule of aniline thus:

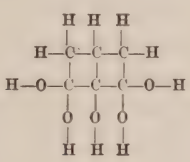


(*$C_6 H_5 N H_2$, aniline*). If we remove the amidogen radical $N H_2$ and

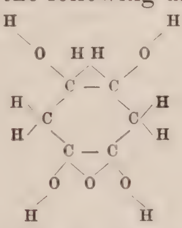
substitute the hydroxyl radical O H, we shall have our old friend carbolic acid, or phénol.



(*C_6 H_5 O H, phénol*). Besides the illustrations given, there is formed on this C_6 group, or radical, capronic acid (C_6 H_{12} O_2), found in butter and other fats; leucin (C_6 H_{13} NO_2), which occurs in the pancreas and saliva; citric acid (C_6 H_8 O_7), found in lemons and other acid fruits; and mannite (C_6 H_{14} O_6), a substance which stands in intimate relation to the sugars, and is largely diffused throughout the vegetable kingdom. In the higher carbon compounds we have the fats, oils, and fatty acids, all of which are formed by adding H and O to a carbon radical. The carbhydrates, consisting of starch, the various forms of sugar, dextrine, glycogen, vegetable mucilage, etc., are divided into three groups, which are built upon two carbon radicals, C_6 and C_{12}. Many of these have the same formula, with the atoms differently arranged. For instance, glycogen and starch have the formula, C_6 H_{10} O_5, but the atoms forming the molecules may be differently arranged as shown in the following diagrams:



(*C_6 H_{10} O_5, Starch.*)



(*C_6 H_{10} O_5, Glycogen.*)

Cellulose also has the same formula as starch and glycogen.

By simply adding one equivalent of H_2 O to either of the above, we have C_6 H_{12} O_6, grape sugar.

The molecule of the proteid, or albumen, compounds is an exceedingly complex one, and has not yet been worked out. It contains atoms of C, H, N, O, and also S and P. If we are now somewhat familiar with the architectural structure of the molecules of these substances which enter into the nutrition of vegetables and animals, let us see how some of them may be formed in nature.

Nearly all of the carbon compounds from which we obtain food material are formed by the decomposition of CO_2 and H_2O in the leaves of the plants, the C, H and O uniting to form molecules, of which I have given you many illustrations, the oxygen being set free. The H_2O exists everywhere in the atmosphere, in the form of

aqueous vapor, and CO_2 is constantly being formed by the union of C and O, in slow and rapid combustion. For every ton of coal burned, there results more than three tons of CO_2. Large quantities are also constantly being furnished by the respiration of animals. The entire relation which plants and animals sustain to each other is deeply interesting. I have said that malic acid may be formed by the breaking up of 4 eq. of CO_2 and 3 eq. of H_2O, with the liberation of 6 eq. of O.; and tartaric acid by the decomposition of 4 eq. of CO_2 and 3 eq. of H_2O with the liberation of 5 eq. of O. Starch, cellulose, and glycogen may be formed by the decomposition of 6 eq. of CO_2 and 5 eq. of H_2O with the liberation of 12 eq. of O. In all of these compounds which I have mentioned, the molecule is formed by simply adding the C of the CO_2 to the H_2O. It has been thought by some that the water is not decomposed in the formation of these substances, hence the names carbhydrates and carbohydrates. But in many of these compounds it has been ascertained that the oxygen liberated is in excess of what the CO_2 could furnish, and so it has been demonstrated that the molecule of water is decomposed. The leaf may be said to be the chemical laboratory of the plant, and it is most admirably constructed for the functions which it is called upon to perform. It is so formed as to present the greatest amount of surface to the air and sunlight. Its interior structure is composed of loose cellular tissue, with abundant spaces for the air which enters with its CO_2 and H_2O through the openings or stomata in the leaves. Here the CO_2 and H_2O meet the juices containing nitrates and ammonia, which have been drawn up from the earth, and from these two sources of supply there is elaborated the cellulose, of which the cell-wall is constructed, and which you have already seen is identical in composition with starch and glycogen, and also the protoplasmic cell-contents,—the essential foundation of all vegetable as well as animal life. The nitrogen in addition to the C, H, O, obtained from CO_2 and H_2O, which is necessary for the construction of the molecule of protoplasm, is taken from the nitrates and ammonia mentioned above as coming from the soil. All of these chemical changes are effected through the action of sunlight in the leaf green or chlorophyl. The plant also contains other principles which from their close resemblance to albumen are called albuminoids. They often contain sulphur and phosphorus. It is thus seen that plants furnish all the nutritive material necessary for the support of animal life.

I have said that the characteristic of animal life from a chemical stand-point is the evolution of force. The function of the vegetable is to raise matter from its elementary condition into a state which, when taken into the animal organism and there *de*com-

posed, exhibits the evolution of force. Animal life, then, is a process of decomposition of carbohydrate and albuminous or proteinaceous substances, obtained from the vegetable kingdom, accompanied by an evolution of force. Vegetable life is a process of combining elements in which the force liberated in the animal organism is said to be *stored.* I very much dislike to use the terms *stored force* and *latent force,* and I propose to present my reasons for dislike or objection to their use. When we stop a moment and consider that force is not an entity, but simply a mode of motion, we see what an absurd contradiction in terms it is to speak of latent heat or latent force of any kind. The fact that force disappears in the building up of vegetable compounds and then reappears as heat or some other form of force when the substance is brought into the proper condition, is no proof that the force is stored up in those substances. These truths are so intimately connected with the phenomena of nutrition, that we may with propriety ask, What is our ultimate knowledge of the nature of force? It seems very difficult for many to eliminate from their minds the notion that force is an entity. Even among our leading scientists, who agree that force is not an entity, the terms latent energy and stored energy are favorite expressions. In the innocence of my mind I think it a very difficult feat, even for the most accomplished scientific person, to store a non-entity.

When an impulse is imparted to the end of a wire in Paris or London, and in a few moments that impulse is felt in New York, no intelligent person supposes that any material substance has passed from Paris or London to New York. When an impulse is given on the surface of the sun and in a few minutes that impulse is felt 92,000,000 of miles away on the surface of the earth, no person who makes any pretense of having an intelligent conception of the matter supposes that a material substance has passed from the sun to the earth. What, then, has occurred? I thinkI can best convey the idea by a simple but homely illustration. Suppose the wire between New York and London to be so nearly rigid that I could, if I possessed sufficient strength, take hold of the New York end and by pushing move the entire length of wire toward London. The result would be that the end in London would move the instant that the end in New York moved. Or, if there were sufficient friction or resistance to the force, the mass of wire might be pressed a little together, so that the London end would move a few seconds later than the New York end. Now, that is a crude illustration, but the best one which I can formulate, of what happens when a telegraph dispatch is sent from London to New York; or a ray of light passes from the sun to the earth. A molecular impulse is given at

one end of the line which is almost instantly felt at the other end. It is simply a motion of some sort which is communicated to the molecules at one end of the medium, and transmitted to the successive molecules throughout the entire distance between the two points. Now, whenever or wherever any special form of force is manifested it means simply that matter has been set in motion. Just previous to its having this particular form of motion imparted to it, it may have been at rest or exhibiting some *other* form of motion.

These movements of the molecules which communicate to us a knowledge of the existence of forces are produced by the rushing together of certain molecules to satisfy what we call chemical affinity. When matter is in a condition of rest, it means that the bonds of affinity between molecules have been satisfied. But as, in the order of creation, it has been so arranged that there shall always be matter in a free or elementary condition, seeking to satisfy its bonds of affinity, the unceasing tumult and clash of molecules goes on; and which, being communicated to us, we say that we recognize or are cognisant of some form of energy or force. Now, there is one very important factor in this problem of molecular force of which I have not spoken, and which is quite necessary to an intelligent conception of the subject. It is our *consciousness* of the existence of these conditions. We are so prone to include this factor or take it for granted that we rarely estimate it at its true value. When, therefore, I say that our consciousness of any energy or force results from the adaptation of the various conditions of matter external to us—our environment—to the mechanism of our bodies, I may seem to be stating an abstruse proposition; but it is a simple truth and may be easily illustrated. Sound, heat, and light, three of the most familiar forms of molecular motion or force, may be regarded as vibratory motions of increasing degrees of intensity. If a rod is set in motion under the proper conditions, we are conscious of a sound when the vibrations have reached 40 per second. If the number of vibrations per second is steadily increased, the sound passes through all the notes in the musical scale, and if still further increased the sound ceases. Why? Simply because the mechanism of the ear is limited in its adjustment to molecular force, the limit being near 40,000 per second, which represents the number of vibrations in the stridulation of the locust. But if we continue to increase the intensity of the vibrations our consciousness is approached through another avenue, and we perceive heat, which is simply the vibration of the molecules raised to a certain degree of intensity. If the intensity of the vibrations is still increased, light appears; and this also, like sound, passes through a scale, known as the spectrum, the upper or violet portion of the scale requiring vibrations of the in-

tense rapidity of 789 trillions per second. We know that the vibrations pass above even this wonderful intensity, producing what are known as the actinic or chemical rays, but we cannot recognize them because the capacity of the mechanism of the eye has reached its limit.

There may be an infinite extension of the various forms of molecular motion of which we have no knowledge. You see the old story of the music of the spheres may not be altogether a myth, and that anthems too fine for mortal ears are perhaps being chanted by the rhythmical movements of atoms and molecules as they dance in the spacious halls of a cell of protoplasm. The immediate antecedent or source of the various molecular movements and changes on the earth is that form of energy which we call sunlight. Atoms or molecules of matter are in motion in the sun. That motion is communicated to the molecules of our atmosphere (through a medium called the ether of space, and concerning which but very little is known) with an intensity sufficient in degree and in quality to affect our consciousness in the peculiar manner characteristic of this energy of light. Heat is probably the energy of light reduced in intensity, and perhaps, also, accompanied by a change in the quality of the motion.

Our scientists say that this sunlight decomposes the carbonic acid and water, and that the energy required to do this is stored up in the protoplasm and carbohydrate formed in the plant, and that it may again appear as heat and light, and the various energies manifested in animal bodies. But the *energy of* sunlight is synonymous with the light, for light is simply *a name* which we have given to this *form of* energy. We have energy as the molecular movement of matter. When the conditions are such that matter is brought to rest, the motion being a non-entity, of course, disappears.

There is quite as much propriety in asking what becomes of the light when the candle is blown out as in asking what becomes of the light when $C_6 H_{10} O_5$ unite to form a molecule of starch. It may be that in making these statements I am criticising one for whose clearness of perception and love of truth I yield the palm of admiration to no one. If the expression "stored radiancy" be understood as meaning the *ensemble* of those conditions of the relations of elementary substances as they exist in vegetable and animal, the *initiative* of whose movements was a ray of sunlight, then I say it is one of the most expressive and beautiful word-images ever invented. The thought that space is filled with this vibratory molecular condition of matter which we call light, and that it is the initiative of every other movement, making possible the exhibition of that condition called chemical affinity, is one worthy the treat-

ment given it by the poet-philosopher of Concord, in his "Song of Nature":

"I hide in the solar glory,
  I am dumb in the pealing song;
I rest on the pitch of the torrent,
  In slumber I am strong.

No numbers have counted my tallies,
  No tribes my house can fill;
I sit by the shining Fount of Life,
  And pour the deluge still."

But the danger in the use of such expressions as "latent heat" and "stored radiancy" arises from the tendency to pass from simply using the terms as a matter of convenience in speech to a mental acceptance of their significance as terms having a material or objective value. In fact, the whole difficulty lies in the very common mistake of attempting to express our thoughts concerning subjective or immaterial states or conditions in terms which are applicable only to that which is objective or material.

Chemical affinity and gravity are not forces in the sense that light is a force. They are conditions of matter in molecule and mass which tend to perpetual rest. But, as I have already remarked, matter is so arranged that there are always free elements seeking to unite in bonds of affinity and be at rest. If this affinity is stronger in the free elements than in those which are united, it separates them, and uniting with a part of them leaves the others free to seek a union elsewhere. Sunlight acting on or in the tissues of the leaves of a plant simply imparts a motion to the molecules of carbonic acid and water, which motion is the condition necessary to enable the H_2O to overcome the affinity between the C and O of the carbonic acid, or, more correctly speaking, the affinities between the molecules are so aroused by this motion or energy of light that they break up the molecules, forming new ones. But my scientific friend says that it can be demonstrated that the same amount of energy in foot pounds may reappear from these carbon compounds which disappeared when they combined. But that proves nothing beyond the fact that the recoil of the molecules of carbon and oxygen, when they rush together to form CO_2, imparts an energy or motion to the surrounding molecules which we recognize as heat and light. Force, whether in the form of heat, light, electricity, or any other energy, is a recoil vibratory or undulatory motion imparted by the molecules which rush together to the molecules of surrounding substances. These recoil motions, heat or energy vibrations, exhibit a law of definite proportions from which have arisen the modern doctrines of the conservation of energy and the correlation or convertibility of forces.

There is but one known force in the impersonal universe, which manifests itself in the smallest particle of matter of which we can have any conception, and the largest mass of which we have any knowledge, as attraction. All of the other so-called forces or energies are simply the perceptions of our consciousness of different forms of motions in atoms or molecules, which have resulted from the exhibition of chemical affinity, or attraction, as manifested in atoms. Chemical affinity does not appear or disappear when atoms or molecules unite or are separated. It is a persistent force, inherent in every atom of matter and existing there always, whether the atom be united with some other atom or in an isolated state; it cannot, therefore, be said to be converted into any other form of energy; for convertibility cannot be predicated of that which eternally persists. The recoil undulatory or vibratory form of motion exhibited in atoms or molecules which our consciousness perceives as energies to which we have given the names heat, light, electricity, etc., may be due to a condition in atom or molecule akin to elasticity. Chemical affinity or attraction is the manifestation of intelligent purpose in matter for the evolution of a universe from chaos.

> "Behold I show you truth! Lower than hell,
> Higher than heaven, outside the utmost stars,
> Farther than Brahm doth dwell,
> Before beginning, and without an end,
> As space eternal and as surety sure,
> Is fixed a power divine which moves to good;
> Only its laws endure."

THE INEXPEDIENCY OF FILING TEETH, AND THE ADVANTAGE OF RESTORATIONS OF CONTOUR.

BY E. A. BOGUE, M.D., D.D.S., NEW YORK, N. Y.

(Read before the Odontological Society of France, and translated for the DENTAL COSMOS by K. H.)

Mr. President and Honored Colleagues: I have made every effort to respond to the kind invitation which our president gave me, but during the month I have been so busy that I have been obliged to dictate to an assistant, while operating, what I wished to say to you. I must therefore ask from the assemblage every indulgence for a communication made hastily without time to study it.

At the October meeting of our society, I presented to you a little apparatus designed to separate teeth during certain operations. The question was asked if a stroke of the file would not be better than this separator. One of my patients has answered this query: "You can take off the separator, but you can't take off the stroke of

the file." Perhaps I misunderstand or may even have taken an exception for a generality in this question about filing.

If you will permit me, I will try to take up the subject again, and should like to call your attention to certain points which have particularly interested me, and which doubtless possess a special interest for all those who are striving before everything else for conservative surgery. Some years ago Dr. Arthur, of Baltimore, one of the founders of our dental schools in America, and one of the best-known writers in our profession, proposed the same thing as did our friend the other evening,—that is to say, a stroke of the file; but as his experience was an extensive one, he recognized that, sooner or later, these filed teeth would feel the injurious effects of decay exactly upon the points which had been deprived of enamel. To remedy this evil, he proposed (following the Homœopathic doctrine, similia similibus curantur) to file vigorously, to cut away a quarter or even the third of a tooth. Many patients and some practitioners think that the remedy is worse than the disease. However, Dr. Arthur had, and has still, many disciples among us, because the facility with which one can cut a tooth and then fill the simple cavities thus exposed is attractive to those who are averse to the intense work demanded by conservative practice. But there are practitioners who carefully preserve as far as possible the shape of the tooth which has been attacked by decay, or even restore it partially or entirely when largely decayed, and the fillings thus put in last so long in comparison with the flat plugs ordinarily used, and give so much comfort to the patients, that there is encouragement to continue the study and practice of a method followed by such good results. I must repeat to you with additional emphasis what I said at the October meeting.*

To facilitate a perfect understanding of my communication, I have taken impressions of several mouths, one of which has the thirty-two teeth well arranged, very little decayed, and with but little tendency to decay. I present this plaster model to you, together with several drawings taken from different sides of the same model. By examining them, you will understand what I am treating of at present, and you will find that all the other models have the same general features. The natural forms, or rather the normal or ideal forms, are the best, the most perfect, and one must examine

* The statement at the meeting spoken of was that Dr. Jarvis was the first to separate teeth by means of a screw; that Dr. Perry had improved on this instrument, and that, with the permission of both these gentlemen, Dr. Bogue had been working on the problem for several years, as he fully recognized the fact that any variation from the normal form or position of the teeth, whether that variation be natural or acquired, is injurious to their permanence.

each tooth in order to know what these forms are and the object of them, as well as the cause for the arrangement which answers to this ideal.

If the crown of a human tooth is well formed, it is more or less yellowish in color, short and tubercular in form, slender at the neck, and only touches its neighbor at a single point, if the arrangement in the mouth is what is called normal or ideal (and please notice that this point is almost never attacked by decay. It is the region between this exact point of contact and the gum where approximal decay makes its first attacks). If, on the contrary, the tooth is weak and of a loose texture, it is more or less light in color; long instead of short from the neck to the cuspidal points, narrow upon its antero-posterior face, broad from side to side, and flat. Teeth with these characteristics are always more subject to decay, and are very often placed irregularly in the mouth, causing food to accumulate between them, and making it difficult to remove it.

We observe, also, certain distinctive signs in the different kinds of teeth: for instance, upon the anterior approximal side of the first superior molar there is a marked depression upon the lingual side, near the tuberosity or convexity which touches the bicuspid. This depression is formed by the branching of the palatine root; it also exists in the other molars, but less visibly, because the palatine root is less distinctively separated. The tuberosity is not far from the middle of the anterior side of the tooth, but it is a little more pronounced towards the buccal side of the superior molars.

The posterior face of these teeth is decidedly more curved than the anterior face. There is less power of resistance to mastication at this point, and we see that the leverage has been well distributed not only in the crown, which is so largely spherical, but even in the curves; those resisting mastication most strongly are continued into the roots, which almost always lean backward in the mouth in accordance with the form of the jaws. The lower molars are less round. They lean towards the tongue, which continually rubs them. They are bathed in saliva and better protected against decay, because the acids which attack the teeth are thus partly neutralized.

Now, let us look at the different curves of the lower jaw (Fig. 1). The first to which I desire to call your attention extends from cuspid to cuspid in two ways, convex toward the lips, then again convex from cuspid to cuspid seen horizontally, that is, upon the line which follows the cutting-edges of the teeth. This arrangement is such that the teeth only touch one another at a little point at the top of the tooth on the outside where the enamel is thickest, and where there is almost never a defect in the formation. Now follow

the lines of the molars, still in the lower jaw. Commencing with the first bicuspid and finishing with the wisdom tooth, the masticating surfaces of the teeth form two curves totally different from those of the six front teeth. First, the curve seen horizontally is concave from the cuspid to the wisdom tooth, and then it is slightly curved in the mouth, the molars leaning toward the tongue and the convex side of the curve being towards the tongue, while the concave side is towards the cheek, thus leaving more space between the wisdom teeth than there is between the bicuspids, according to the form of the tongue. For, it must not be forgotten that the tongue upon the inside of the mouth and the lips and teeth outside are continually active instruments in the regularization of the teeth during the period of formation.

Let us turn now to the upper jaw and take the six front teeth. We find nearly the same lines as below,—that is, from cuspid to cuspid, a curve with the convexity in front towards the lips. There is also another curve or convexity, of which the central incisors are

Fig. 2.

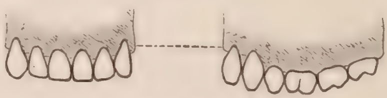
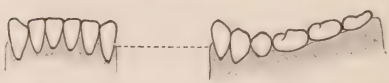


Fig. 1.

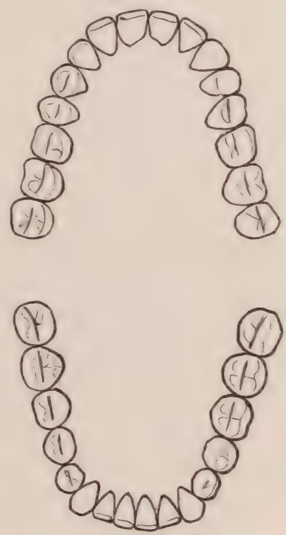


the longest, while the laterals are shorter, so that when the two rows of incisors close, the central incisors, upper and lower, touch before the laterals and act like scissors. (Fig. 2.) If we follow the line of the molars, we find that the arch of the incisors and cuspids is no longer preserved, but that the lines become nearly straight or rather slightly curved towards the interior of the mouth to meet the lower molars. Hence the wisdom teeth are much further apart than the bicuspids (Fig. 3). The curve seen horizontally, from the cuspids to the wisdom teeth, is convex towards the lower jaw, and the first molar is the largest, longest and most prominent of the dental arch. It is the same at each side, with some slight differences. We notice especially that the horse-shoe shape, which we so often see in the mouths of those unhappy victims who have fallen into the hands of "tooth-carpenters," is not a natural shape. These horse-shoe sets of teeth, which if placed upon a table teeth downward would touch at all their points, do not in any way correspond to the normal forms. When this normal form is perfect it is sometimes accompanied by a peculiar conformation of the lips, known among artists and sculptors

under the name of "Cupid's bow." The middle of the upper lip falls considerably, while at each side it rises in a graceful arch, which descending anew, rises finally at the commissure of the lips in a little curve, smiling even when the mouth is in repose. Now, take away the teeth from this mouth, and put into it a horse-shoe plate; the graceful lines and curves just described, which recall to us our celestial origin, disappear; the mouth becomes a mere slit or button-hole; meaningless, except as an opening for the absorption of food. Every trace of beauty, as well as a great part of its usefulness, has disappeared.

If we change the arrangement of the teeth in the mouth in the converse way, that is, by diminishing the size of the arches, we make the expression of the lips heavy; and the power of producing clear and sonorous sounds is diminished. No one can sing well unless the vault of the palate is perfect, and it is impossible for it to be so if teeth have been lost in the front of the mouth, or even if a large portion of several teeth has been lost. For example, we file off the tuberosities of the bicuspids and the first molars, so that the sides of these teeth are left flat, and we have only flat fillings to insert in the carious cavities. (Because, of course, we never touch a tooth with a file save from the greatest necessity.) The first effect of this filing is, that for several days, perhaps even for weeks, the patient loses sounds each time that he begins to speak. Little by little he acquires the habit of partially closing these openings between the teeth with the tongue and the cheeks. Besides, and what is still more unfortunate, the teeth lean towards one another, and in a short time we have surfaces approximating each other in the form of a dovetail, from which it is absolutely impossible to remove the remains of food accumulated there. Soon acetic fermentation, which is to be found especially in these hidden corners, performs its destructive work, and we have a renewal of caries nearly or quite as extensive as the surfaces which touch each other. As the tuberosity of each tooth has been removed, we have augmented the region susceptible of being attacked by caries, in proportion to the former good or bad form of the tooth. If the tooth was well formed, that is to say, short, rounded and yellowish in color, we have probably removed but little of its substance, for we have

FIG. 3.



procured all the room necessary with but little filing. If, on the contrary, the tooth was delicate, long, and flat, we shall have been obliged to file considerably, perhaps largely, and the two approximal walls which have approximated are large in proportion. Caries recommences; the teeth are filled the second time after a further filing and the loss of a considerable portion of the remainder of the tooth.

Among these models are two to which I desire especially to call your attention. The first is that of a mouth in which the teeth have been necessarily filed, and well filed, and the fillings, inserted by Dr. Pugh, of Philadelphia, about eleven years ago, are still in a good state of preservation. In this case I see nothing better to do than to employ the file. As you see, it is one of the exceptional cases which proves the rule. The other model is that of a patient coming from New York, whose incisors are well filed (that is, if we can admit the utility of filing them at all), for the separation is much larger upon the lingual sides than upon the labial. Because of this shaping, these approximal surfaces have been so well cleansed since they were filled, whether it be by the action of the tongue, of food, or of the brush, that caries has been entirely arrested. The molars in the same mouth, as you see, have been very badly filed with a flat file, which left an opening easy to fill up with the débris of food, and difficult to cleanse. Caries has consequently pursued its destructive work near the gums upon the first molar and second bicuspid, until there now remains of each scarcely the half.

In presenting to you the separator, I wished only to say that it would serve to slightly separate certain teeth and hold them steadily while they were being filled. If these teeth have been previously separated by cotton, tape, or other means, the separator holds them firmly during the operation without the least pain, after it has been once adjusted. When the filling is ended, another turn or two is given to the screw to obtain room enough to polish the fillings without removing those points which ought to touch each other when finished. There are certainly teeth which cannot be separated with this instrument, but as it may frequently be needed, and as it generally causes no pain, but sometimes even prevents the extreme tenderness which follows the gradual separation of teeth, it will without doubt soon be accepted by those who desire as far as possible to spare pain to their patients.

Several of my colleagues who are present this evening have seen operations done by the aid of this instrument, and they have had opportunity to question the patients as to their sufferings during the operations. It will, therefore, be easy to obtain the facts upon these points. Judging from my own experience, I should conclude

that the filing of teeth, as it has been and still is practiced among the mass of practitioners, is a bungling mode of obtaining room for delicate operations (Figs. 4 and 5).

Suppose, for example, two cavities opposite to each other, between the first molar and the second bicuspid. We can with a chisel or with a burr in the engine open a hole in the grinding surface of one of the

FIG. 4.

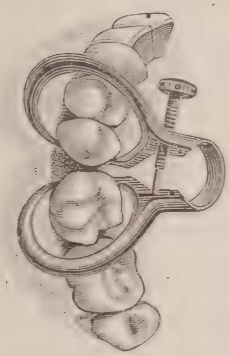
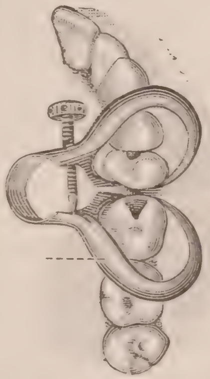
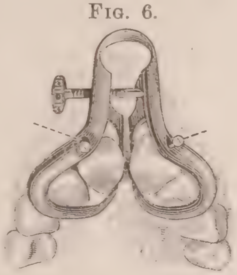


FIG. 5.



teeth, which shall expose perfectly the two cavities. This leaves the two sides adjoining the cavities in both teeth intact. If the cavities are near the gums, we can make our entrance from the buccal side, being careful to make the largest opening in the tooth which is most decayed. Sometimes it will be necessary, in order to obtain complete access, to cut both teeth, but generally one will be enough. Between the incisors and cuspids a little separation should generally be made with cotton or tape during three or four days before the operation. Then, if the cavities are large, the teeth may be cut upon the linguo-approximal surfaces in such manner that the labial surfaces are not touched, and the fillings, being inserted from the lingual side, are not visible from the front (Fig. 6). If the cavities are small, we separate the teeth with tape or other means until there is enough space to work in without cutting at all. These examples are the general rule, for all the others are only modifications of these.

FIG. 6.



Now, having prepared the cavities, if we make use of a little wooden wedge between the two teeth, or the separator, which would be less painful to the gums than the pressure of the wood, we can fill with whatever material we choose without harming the original form of the teeth. If we use amalgam or other plastic filling, we

have only to put a small piece of thin platinum between the teeth to prevent the two fillings from uniting, taking it out the following day; then with a thin tape, waxed and dipped into some kind of powder, we can polish and shape these fillings in such a way as to increase their durability and the comfort of the patient very greatly. When this advantage is once well known, there will no longer be any difficulty in governing patients and making them submit to anything which is really necessary. If we are putting in gold, we save much time and uncertainty if we use cylinders or cushions of gold for the bottom of the cavity,—that is to say, gold folded upon itself so that the folds are parallel. These cushions or cylinders should be placed in the cavities so that the folds may be parallel with the bottom and walls. This gives us a foundation upon which we can add cohesive gold in ribbons or in crystal according to our personal manner of working.

During my discussions with Dr. Arthur—discussions friendly, though serious, and about which I was corresponding with him at the time of his death,—I examined separately in the museum of the University of Harvard and the Academy of Natural Sciences at Philadelphia, besides those which I could find in New York, more than 500 skulls, and I found only three upon which filing after the Arthur plan could have been practiced without harmful results to the teeth. I was upon the point of giving the results of these observations to the profession, when the death of my friend prevented me for the moment from combating his views, and since that period I have never found the time to take that work up again.

In conclusion, I recognize perfectly that the man whose leg has been crushed under a railway train must submit to the amputation of the limb, and we regard with great respect the surgeon who knows how to cut it off. But with how much more respect should we consider one who could save it. Admit in the same manner that there are circumstances in which the amputation of a certain part of the tooth is necessary. I plead only for the preservation and restoration as far as in us lies of all the organs committed to our care, the well-being of the patient being always the first consideration.

[The following note, just received from Dr. Bogue, is appended to the paper at his request.—Ed. Dental Cosmos.]

New York, February 14, 1885.

Dr. J. W. White:

Dear Sir: Dr. Perry showed me last evening, for the first time, his improved separators.

I find his incisor separator so marked an improvement upon my own form, that I desire to acknowledge its superiority.

Yours faithfully,

E. A. Bogue.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a regular monthly meeting, at the residence of Dr. W. H. Dwinelle, No. 15 West Thirty-fourth street, Tuesday evening, December 16, 1884.

The president, Dr. William Jarvie, in the chair.

Incidents of Office Practice.

Dr. J. Smith Dodge, Jr. I would like to say a word about a way of using cocaïne. I suppose we are all experimenting with it, and I think we have all learned by this time that, like a good many other things, there is more in it than we had at first supposed. But there is one use that so promptly approves itself that I take the opportunity to suggest it to any of you who have not thought of it. We frequently have to do a little violence to the borders of the gums, and I have found that, by simply giving the gum a bath of the four per cent. solution of cocaïne, you can put on the rubber-dam and work it up with ligatures to your heart's content without causing pain. In the same way, trimming off the cervical border of approximal fillings, from being, with many patients, one of the most objectionable features of the operation, becomes painless. This is quite on a line with the use that surgeons have made of the drug. It renders these operations so comfortable to the patient and delightful to the operator that, the other day as I was using it again in that way, it occurred to me that I would mention it here.

President Jarvie. This is a very admirable suggestion that Dr. Dodge has made. Many of our members have been experimenting of late with this agent, and there may be something else to be presented on the subject.

Dr. J. Morgan Howe. I will say that I have twice applied a ten per cent. solution to exposed pulps that had been irritated and were aching very severely, and the result was almost instant relief. In another case a pulpless tooth with periosteal inflammation of an acute character was aching severely, when an application of the same solution in the canal of the root was followed by marked amelioration of the pain very soon afterwards.

President Jarvie. I will ask Dr. Howe if, in the case in which he applied it to an exposed and aching pulp, it acted any differently or any better than creasote or carbolic acid would have done?

Dr. Howe. I could hardly say whether it acted any quicker; I do not think it did act quicker than I have seen carbolic acid or

creasote act, but it acted quicker than either of them ordinarily acts. That is all I can say about that.

President Jarvie. The question in my mind was whether it was preferable to the remedies we had already in the cases you speak of, —those of aching pulps.

Dr. Howe. I do not know whether the effect of the cocaïne would be as lasting. I should expect its anesthetic effect to pass off in from fifteen minutes to three hours. I have known it to last as long as three or four hours, but I believe the universal experience has been that its effects are transitory.

Dr. Dodge. I can describe one case in which the effect of cocaïne was very striking and very satisfactory. It was a lower bicuspid, largely decayed, and having that unpromising look that we are all familiar with. The first touch of the instrument to the débris in the cavity gave severe pain. The rubber-dam was put on, and a drop of cocaïne was mixed with the mass that lay in there, and in two or three minutes it was possible to partially cleanse the cavity. Then some more cocaïne was applied, and after three or four successive applications of it in that tooth, I was able, with a broad spoon-shaped excavator, to scrape vigorously across the bottom of the cavity, where there was an exposure of the pulp as big as the head of a pin, and which looked thoroughly red. The lady, who was an intelligent patient and knew what I was doing, assured me that I had given her no pain that was worth speaking of. The cavity was subsequently filled in the way I usually follow, and several weeks have elapsed without my hearing anything from it. I certainly should have heard from it if it had not done well. In this case an operation that usually would be exceedingly painful was made painless, and without the least ill result following. I had another case where there was not quite an exposure of the pulp, but from the character of the patient's teeth, which I have known for a good many years, it is very certain that we should have had a scene if I had not used the cocaïne. But, in that case, the operation was pronounced absolutely painless.

Dr. F. Y. Clark. I have been experimenting with this drug somewhat, and, from the results of my experiments, and from what I have heard stated by others, I am inclined to believe that I could not have had a pure article. I have tried from four to ten per cent. solutions, with rubber-dam on, and under very favorable circumstances, and it had no more effect than so much water. In fact, I think the teeth were more painful after its application than they were before. I procured it from a reliable party, who assured me they made it from the crystals. We have but one agent that will accomplish what we want in certain cases of sensitive dentine, and

that is arsenious acid; and we know how dangerous an agent that is,—that we cannot use it in any case without danger to the pulp. It may be well to inquire what is the effect of cocaïne when it is left in a tooth one, two, or five hours. If it accomplishes so much in a few minutes, what would be the effect if it was left in a little longer? We do not know how far its action may go, and it would be well to consider what the effect is of so powerful an agent upon the pulp of a tooth. Possibly the tissues may absorb it to a dangerous extent, and its effect may be such that we may finally have more trouble from its use than the temporary good effects will warrant.

Dr. W. H. Atkinson. With reference to the subject of cocaïne, it may be well to state what has been very largely published regarding the experiments with this agent, which is, that it has the peculiarity of having no reaction; it is the one anesthetic that leaves the system without reaction, so far as known, and it has been used in very large doses, both internally and by subcutaneous injection. I have had it used in my own person, and I know it does not take long to recover from its effects. I have used it in my patients' mouths, where reaction came on so gradually that they did not know the time when its influence left. I do not think we need to be at all deterred from using it vigorously, either the alkaloid itself or any aqueous solution we may make. I have made my own solution. I have not seen much difference in the anesthetic effect of the ten per cent. solution and other strengths down to two per cent. I think there is a difference in the sensibility of different organisms that makes a great difference in its effect. I have been led to think that it has to be absorbed into the tissues. One case occurred in Chicago where a boy, eight years of age, by breaking a glass, cut his arm so that the veins and the radial artery were severed. A surgeon seized it, tied it up with a handkerchief, and painted it with cocaïne,—the four per cent. solution. He then took up and tied the vessels which required ligation, and used torsion on the smaller ones. During the operation the boy kept getting ready to flinch, but did not. When asked why he did not, he said he expected to feel the pain, but did not feel it. I judge from that case that the cocaïne is absorbed into the tissues.

Dr. W. H. Dwinelle. I think that our prior knowledge of the coca plant, from which cocaïne is derived, before we knew of its anesthetic properties, would justify us in considering it a harmless remedy. We know that for many years the leaves of this plant have been an article of export all over the world. I would not undertake to state, without the authority of the figures before me, the extent of the exportation of the leaves, or how many hundreds of thousands or millions of dollars are employed in it; but we do

know that the article has been known for a long time,—since the early part of the sixteenth century, I think,—and regarded almost with superstition, being called by the natives of Peru the "divine plant." For hundreds of years it has been used freely as an article of peculiarly invigorating effect as a tonic,—I had almost said of diet. The natives of Peru, who carry heavy burdens up and down the mountains, are satisfied, if their pockets are filled with coca leaves, to dispense with all other food or diet for days together. Its products have been employed medicinally in the form of extracts, infusions and wines of coca for a long time. If there is anything offensive, or any dangerous quality in the article, it certainly would have manifested itself before this time. It is not a caustic like arsenic, whose influence, when applied to a tooth, is progressive, until it ultimately destroys its internal vitality, but rather belongs to the sedative and temporary order of remedies. Before the anesthetic effect or property of cocaïne was known, it had almost been discovered by others that it had this quality. I forget now the name of the French chemist who first discovered and made an alkaloid of coca; but, in that discovery, he almost hit upon the one that Dr. Köller recently made. He found that, when cocaïne was brought in contact with the tongue, it produced a peculiar numbness, which was a well-defined anesthetic effect, but soon passed away. So I think we are entirely justified, aside from the lessons derived from the many surgical operations that have been performed recently under its influence, in regarding it as perfectly harmless to the human system. Its anesthetic effect is invariably temporary.

Dr. W. George Beers. With reference to the fact mentioned by Dr. Dwinelle as to the use made of coca leaves by the natives of Peru, I would say that it has been for seven or eight years a common custom with Canadian athletes to chew these leaves, and I myself have traveled on snow-shoes forty or fifty miles, as long ago as five or six years, without fatigue, by frequently chewing these leaves. They have a bitter taste. The effect is stimulating and tonic; it seems to be invigorating, and enables one, who is not a professional athlete, to tramp on snow-shoes twenty or thirty miles without much fatigue.

Dr. Dwinelle. I do not know whether I stated, when I was up before, that coca was regarded as a tonic of the most beneficial character, and that it was a substitute for food. I recollect reading of an instance where a person had gone sixty hours without sleep and without any other food than coca leaves. In that case, it was a substitute for sleep as well as for food. Many other similar instances are on record.

Dr. Clark. If it is harmless, I am glad to hear it, as otherwise

its use might lead to results that we should greatly regret. If it is harmless, what would be the effect upon the dentine?

Dr. Dwinelle. I do not know, except so far as has been determined by experiment. It seems to be a peculiarity of the article that a ten per cent. solution is oftentimes no more effective than a four per cent. solution. I think, as has been suggested by Dr. Atkinson, that the effect depends upon the idiosyncrasy of the patient. Some men are able to eat with impunity a quantity of opium sufficient to kill ten other men. As the saying is: "What is one man's meat is another man's poison."

President Jarvie. Dr. F. W. Seabury, of Providence, is here this evening, and he will now make some remarks on the subject of

Steam, and Its Effect on Rubber and Celluloid When Properly Applied.

Dr. F. W. Seabury. Feeling the general want of something more definite and satisfactory in the manner of manipulating rubber and celluloid, I have experimented, with the following results:

Rubber, exposed in a hot chamber, swells up and becomes porous; compressed in molds and subjected to heat, its density, after curing, is in proportion to the amount of mechanical pressure employed. When vulcanized in a water or steam-bath, pressure is then essential to density, or hardness. The element of toughnesss is secured by a mild, even temperature. There are several ways to attain this. The pot vulcanizer was the first. The rubber is placed in an air-tight vessel, immersed in water, and vulcanized from four to twelve hours. The sealed vessel may be immersed in a tray full of water and placed in a steam bath; this is a very mild heat. Chambers nearly surrounded by a water or steam-bath are in common use. These processes answer quite well; but rubber manufacturers have always been experimenting to get dry or super-heated steam, it being a good conductor of heat and a very mild fluid. With the water-bath vulcanizers now in use, it is impossible to distinguish a pure, clean rubber, from one of low-grade stock, loaded with dirt and pigments. When the several red dental rubbers now on the market are vulcanized in the usual way, in a Whitney or pot vulcanizer, they have to be marked before they are put in to vulcanize, in order to distinguish them when taken out. Intelligent experiments cannot be conducted with a Whitney vulcanizer, or with one constructed on the same principle.

The first thing to do, then, is to get a process of vulcanizing which will develop the color. It has been known for years that this could be accomplished by keeping the rubber absolutely dry, by

sealing with tin-foil, baking in a hot-air chamber, or curing with super-heated steam. When rubber shrinks, it is either because it has not been properly seasoned, both after washing and after mixing, or it has been packed and vulcanized in a water-bath. The water will separate the rubber from the teeth every time, so that one can get the shrinkage only in a dry oven. Super-heated steam, applied instantly, is the perfect medium for conducting heat to rubber, because it gives the best color and preserves the elasticity of the rubber. Being a rarefied gas, the indicated is always the actual temperature for all parts of the oven, and rubber need never be burned or made granular or porous. That is to say, in order to vulcanize rubber properly, the steam generator must be separate from the vulcanizing chamber, so that the high-pressure steam can come into the chamber instantly, to produce pressure before the heat can be communicated to the rubber.

The term "super-heated steam" is a misnomer to me, and, I think, to others. I will try to explain my idea of it. Intensity of heat is measured by the number of heat units in a given space,—increasing the space diminishes the heat, and decreasing the space increases the temperature, in uniform ratio. When fire is applied to steam, the vapor atoms are expanded, and, of course, occupy a larger space, and if they are not confined their temperature will decrease. A friend of mine, Hon. Ellery Wilson, president of the Rumford Chemical Works, extended a steam-pipe through a large fire-pot, heated white hot, in order to get super-heated steam. He was surprised to feel a draft of cool air coming out of the pipe. After super-heating steam in my vulcanizer, if the test-cock is opened, the steam will feel cool. So, to my mind, "super-dry steam" would more nearly express the product. George W. Richardson, the inventor of the pop safety-valve, in order to save the waste from radiation and increase the power of the steam by superheating, jacketed a locomotive all over, including the cylinder heads, and attached a blower to the flue. The products of combustion in the flue registered 800° F.; the temperature of the steam was 400°. The hot air lost 300° in passing through the jacket, without increasing the temperature of the steam. The locomotive was run one week, using the blower, and the next week without it; coal and water were measured both weeks, and there was no difference. So, to increase the temperature one must increase the pressure, the heat of steam being dependent on pressure. This is in accordance with the law of mutual repulsion of gases. Vapor lacks capacity for heat. A drop of water will contain 830 times more heat than a corresponding drop of vapor. The steam being dry, the color of the rubber is improved, and is of course uninjured by water or moisture.

To harden dental rubber appears a simple matter enough ; but to do it so that it may maintain its best qualities is more difficult than most persons suppose, and a large proportion of the rubber dentures manufactured are either over-steamed or insufficiently hardened. For this there are several reasons: First, it is found that as the pressure of steam in water increases the conducting power decreases, and the heat tends to accumulate near the point of application. Second, the air in the top of the vulcanizing chamber protects the thermometer from the steam, as air, when still, is a non-conductor. Wildman, by opening a safety-valve in the top of the Whitney vulcanizer, thus causing a circulation, increased the indicated pressure thirty-five pounds to the square inch. Rubber manufacturers, when vulcanizing, keep blowing off steam, thereby causing a circulation and equality of heat in all parts of their long ovens. Third, when water comes in contact with rubber, it destroys the color, makes it soft and porous, and also prevents it from adhering to the teeth.

All authorities agree that to get the best results when vulcanizing rubber the temperature of the vulcanizing chamber should be gradually and slowly raised. My process is just the opposite. I commence with dry steam, at high pressure and high temperature, and I claim that rubber cured in this way is tougher, takes a higher polish, and makes a closer union with the teeth; produces a lighter and brighter color, and requires less time to vulcanize and finish.

How Celluloid is Made.—A roll of paper is slowly unwound, and at the same time saturated with a mixture of five parts of sulphuric acid and two of nitric, which falls on the paper in a spray. This changes the cellulose of the paper into a fine pyroxyline (gun cotton). The excess of acid having been expelled by pressure, the paper is washed with plenty of water until all traces of acid have been removed ; it is then reduced to pulp, and passed on to the bleaching trough. Most of the water having been got rid of by means of a strainer, the pulp is mixed with from twenty to forty per cent. of its weight of camphor, and the mixture thoroughly triturated under millstones. The necessary coloring-matter having been added in the form of powder, a second mixture and grinding follows. The finely divided pulp is then spread out in thin layers on slabs, separated from one another by sheets of blotting-paper, and from twenty to twenty-five of these layers are placed in a hydraulic press, and are subjected to a pressure of 140 atmospheres until all traces of moisture have been got rid of. The plates thus obtained are broken up and soaked for twenty-four hours in alcohol. The matter is then passed between rollers, heated to from 140° to 150° Fahr., whence it issues in the form of elastic sheets. These sheets are then molded into dental blanks, at 260°, and seasoned. Cel-

luloid is in general use, and, as manipulated by manufacturers, the colors stand; it does not warp or crack, and there is no shrinkage. The reason of its failure for dentures is due entirely to the improper method of molding it. Celluloid will adhere to porcelain with sufficient tenacity to pull the enamel off a tooth. Molded on metal dies, and covered with tinfoil, it receives a vitreous surface, which is a non-irritant, and also protects it from the fluids of the mouth. In using single teeth on metal plate, it is necessary to have some substitute for the gum. Celluloid, when properly made, answers the purpose well. Molded in a dry chamber, at 300° Fahr., it will adhere to the gold plate and teeth, making a perfect union, and thus preventing the absorption and retention of the fluids of the mouth and consequent offensive odor. Used as a veneer on gold plate, it is easily repaired.

Dr. W. George Beers, of Montreal, Canada, then read the following paper on

The Teeth of Children.

Once upon a time I thought I knew something of the predisposing causes of dental caries; but the more I read and observe, the more disposed I am to change dogmatic points of exclamation for modest marks of interrogation, and to sit as a humble hearer rather than to pose as a presumptuous preacher. Indeed, I now know that I know less than I was sure I knew when I was in my first year of practice. In respect to the increasing decay of children's teeth, I feel every day such a growing degree of ignorance that I expect soon to exclaim with the ancient philosopher in search of knowledge: "All I know is that I know nothing!" It is amazing how the omniscience of a newly-fledged dentist disappears as he gets riper experience. Dental theories in science and practice, like the toy blocks of children, seem in our day to be set up only to be upset. Thought, which once crept, now flies so fast,

> "We think our fathers wrong, so wise we grow;
> Our wiser sons no doubt will think us so."

I have a very keen sense of the risk I run in speaking here upon a subject so trite, but I venture to do so that I may get, not that I expect to give, information, and because I believe that it is a subject of the gravest importance, even should it be sneeringly treated as "milk for babes." I cannot, after the open confession that I have made, expect to tell you anything new, but, as Seneca says," a thing is never too often repeated that is not sufficiently learned." Moreover, if we all wait till we are able to contribute something purely original, many of us will never contribute anything; and if we are

debarred from the discussion of subjects familiar to us all, we may rarely discuss anything, because everything seems to have been discussed.

It is probably a perfectly safe estimate to make that in American and Canadian cities of fifty thousand people not a hundred native-born can be found between the ages of four and fourteen who have wholly escaped caries and premature loss of some of their teeth. If this ravage was to proceed in the same ratio, men and women would be edentulous by the time they were forty, were it not for the preservative skill of the dental operator. It is a fact we must recognize that, were it not for the services daily rendered to humanity by our profession in this country, the largest proportion of the adult population would be comparatively toothless. Is it not becoming identically the same with children, so that we may say, were it not for the services daily rendered to them, the largest proportion would lose at least the deciduous molars before they were five years old, and the sixth and twelfth-year molars before they were fourteen? In fact, so common is the disease, even in Canada, that it has long been one of the popular superstitions we should aim to destroy, that the decay of children's teeth is as much to be expected as their eruption; and the children themselves have been largely educated by bitter experience to look upon it as a fatality of childhood, and may reason about it after the manner of a curious epitaph over the grave of an infant:

> "Since I was so quickly done for,
> I wonder what I was begun for."

Supposing it could be proved that in our public schools the lobe of one ear, or the little toe of one foot, of every tenth child were becoming tender to the touch and diminishing in size, would it not cause dismay? Would not the public mind be agitated to deep inquiry if it were found that the hair of every tenth child was turning gray, or that crow's-feet were marking their lines about their eyes? And supposing on the ear, the eyes, and the hair, at birth, there were visible indications, such as there are so often at the eruption of the teeth, which predetermined decay, would we be satisfied with mere investigation of the exciting causes, or would we not feel bound to search for causes in embryo in such a coincidence? Caries of the teeth means decay—death—as much as the graying and loss of the hair. Why should any part,—the teeth any more than the hair,—decay and die prematurely? Has it come to this, that we must accept early decay as an inevitable coincidence of their existence? Are we to believe that the teeth are the unfittest part of the body to survive, and that this trade-mark of death is impressed on

the very embryo, and is to be carried in the mouths of otherwise healthy children from the time of their eruption?

I have long since lost all surprise and wonder why the teeth of adults decay. The surprise to me is how so many escape. What boots it if the wisdom tooth should become rudimentary in civilized races? What good is it? Why should we break our hearts over the caries of the teeth of adults who have preventives, preservatives and substitutes, and think or do so little for those of children who are not able to suffer like adults, and who certainly cannot have the loss of natural teeth supplied? The only sincere surprise and pity I have left is for this caries of irresponsible children. Even the woman who expects pregnancy can make preparations against coincident or consequent dental affections. Half of the men who suffer disease and loss get just what they deserve. But it is not so with children, and I am anxious to have my gross ignorance enlightened, even at the cost of abandoning strong convictions. There must be something for mother, child, dentist, and physician to do which is not done.

The average baby is born into the world as toothless, though fortunately for its teething not so tough, as a turtle. Every other feature is presented in a recognizable form, pretty much as nature premeditates, whether perfectly or imperfectly developed. One can tell fairly well if the little bit of humanity is to have its mother's eyes, or, in spite of the preternatural snub, its father's nose, or if it is to be a new departure, or an old revival of the ancestral physiognomy. Whatever physical defect of eyes, palate, lips, or extremities is inflicted upon the child, whether congenital cataract, cleft-palate, hare-lip, or club-foot, may be detected at birth. Nature, however, loves the darkness in dealing with the teeth. She might have grown the teeth as soon as the eyes, and she might have put guards about a woman's nipples. We know the wisdom of the arrangement as it is; and one would suppose that the very invisibility in which she keeps the teeth would provoke more inquiry as to their healthy future. I know women who became physiologists when they became mothers; who went to work to study how the coming teeth were to come, with as much interest as they had ever studied the harmony of colors, or the superiority of wood or woollen for carpets. So it should be in every case. But I am not sure that parents would not learn more and care more about the teeth were they born like those of Marcus Curius, the Roman consul, who Pliny states had a full set at birth. Yet it is a fact that in many cases they are no sooner into the world than they are into trouble. Nature, as I said, forms them in the dark; and there, after birth, they lie in their secret chambers for the first five months, a hidden foe to

the mother's rest and the little owner's peace; the puzzle of the ancient physiologist, who thought the pulp a worm; the despair of the old Greek pathologist, who attributed all infantile mortality to teething, and who declared that the cause of toothache "is known only to God."

When we consider that nature is busy at work long before birth constructing the second set of teeth; that the enamel-organs of the first permanent molars appear about five months before birth, those of the second molars three months before birth, and those of the dentes sapientiæ fifteen or sixteen years before they erupt; that a child has, from its fifth year to the eruption of its first molar, forty-eight developed teeth, or the calcified germs of teeth in its jaws, and that the structural condition of both temporary and permanent is determined in embryo, we ought surely to realize the importance of study in this direction. If we accept the acid theory of caries, and especially associated with the softer character of the dentine and enamel of the deciduous teeth, we may assume that there is no more mystery as to the exciting causes in the teeth of children than in those of adults. But healthy children, from two to seven years old, have not lived enough to be exposed to the principal exciting causes of caries. Or must we declare that, just because of the softer character of their teeth, the exciting causes are more active? But, again, they are in the period of growth; nutrition is most energetic. Why is this period associated with decay? Allowing that in modern habits of life and diet we may find immediate causes, these have nothing to do with structural conditions (and it must be admitted that predisposing causes and conditions exist, for which the child is in no way responsible). I would throw the main responsibility upon the mother, given that there is no existing or hereditary disease on the part of the father; and accepting the disturbance of the nutrition of the teeth during the intra-follicular evolution as now a very common coincidence, would seek in that direction for the first, and, most often, the only predisposing causes of caries. It would seem, too, as if in certain maladies the condition of enamel is invariably disturbed. So true are the embryonic and post-natal results of certain conditions of the mother and child, that it seems to me that until we have defined and laid down in some specific way the attendant risks to which tooth-development is subject, and discover how these risks may be governed, we are studying predisposing causes very much in the dark. We know that the breed of lower animals and the quality of plants and flowers may often be altered and improved. Is this to stop at mankind, or can we in any way influence the vital forces which govern the rudimentary genesis of the embryo and of the teeth?

Can we do anything to secure molecular perfection; to feed germs; to prevent intra-uterine disturbance; to grow good teeth, as we can grow good geraniums? Have we any control of the embryo through the mother? Can we control nutrition,—assimilation,—or are we to abandon that idea, take the teeth as they come to us in their steady decadence, and make no effort to grow better? Is dentistry to confine its science to its practice, or is there a day to dawn when the embryologist will be consulted, as the architect or the builder; and the teeth will have become so bad that he will find large occupation in studying the idiosyncrasies and habits of people who intend to marry, or who are just married, and advising and prescribing diet, habits, etc.?

Of late, there seems to be a disposition to question the value of administering phosphates during pregnancy and the formative period of the teeth. It is important to know if the system will resolve and appropriate certain elements to different uses; to know if it will take up phosphate and carbonate of lime and magnesia, and direct them to the growing teeth. Nothing establishes truth like attacking it. It will stand if it is truth. So let us pitch into truth just to make it shine out. If what we have supposed to be truth is only fraud in disguise, the sooner we know it the better. It was a very hard pill for the old anti-amalgamites to swallow when they had to abandon preconceived ideas and admit that they had been trying to believe the black coating on the old material to be an injurious preparation of mercury, instead of what it was, an innocuous preparation of silver; in other words, that they had been trying to believe what they had wished were true. Now, unless somebody can upset better than that what many of us believe as to the value of the phosphates, by giving analytical proof from actual experiment performed upon pregnant women and the fetus at various periods, or at least upon the lower animals; unless some one can substantiate doubt by physiological and chemical proof that the formative period and the pregnant condition as regards the teeth cannot be modified by special nutrition, I venture to believe that we possess sufficient evidence to warrant the theory that lime, furnished in such forms as will be easily digested and assimilated, does contribute to dense development and perfection of tissue. Is there anything unscientific or unreasonable in the assumption that we can feed the germ through the blood of the mother, when we know that through the mother's blood the embryo is fed? And have we not analogous evidence in the animal and vegetable kingdoms to assure us that our creed is not founded upon guessing?

Chemical analysis tells us what it is that gives the teeth their superior hardness over the bones, and what their condition is when

they are defective. It seems to be the conviction of histologists that once the enamel is formed it cannot be modified, as may be the dentine, which becomes denser by age. The structural character of enamel is, it is said, unchanged and unchangeable, except by external causes. We may not know all of the truth yet in this matter; but we know that in the development of the fetus lime is abstracted from the tissues, and especially from the teeth, of modern mothers, and that this alteration in the latter goes on in the dentine so as to predispose the unchangeable enamel to some alteration, whether structural or not. Do you not think that indirectly the enamel may be influenced through the blood of the mother, by the administration of the lime-salts which are absolutely necessary to its nutrition? It seems to me we know a good deal to encourage us. Chossat's experiments proved that by abstracting lime from food artificial softening of the bones in animals can be produced; that life will not be sustained if food is deprived of its phosphates. We know that rickets, scrofula, and many other diseases, even difficult dentition, owe some of their origin to the deficiency of lime and magnesia. We know that, during gestation and lactation, the phosphates and carbonates are usually insufficient for the demands of the mother, and every day we see the result in the softening and decay of her teeth. At no time of life are these so urgently needed as when two lives—one in embryo—have to be supplied through the one channel. We know that if we keep lime from fowls they will have eggs without shells; that cows fed on land sown with bone phosphates will give richer milk; that wheat, planted in earth deprived of phosphates, will die soon after it germinates; that we cannot get flowers on peas which are sown in a soil containing no phosphates. We might confine this argument entirely to facts known as to animal life and diet; and, knowing all we know, though having to admit much ignorance, may we not continue to preach to our patients the gospel of lime? Is it not a fact that the debility from which so many pregnant women suffer is due to the waste or lack of this element, and that the evidence is more than circumstantial that direct and rapid changes have been induced by its supply? If I knew enough, and had opportunity, I would like no better way of experimenting than to begin at conception, and test in a thousand cases the influence of lime upon the coming child as well as the mother. If what we know, or what we hope to know, is to be of any practical value,—and knowledge that cannot be made practical is better unknown,—we must do what we can do in the early months of pregnancy.

While we cannot, then, weigh out earthy phosphates by measure and expect them to be digested and assimilated as readily as

water will be absorbed by a sponge, we can expect this from such preparations as the syrup of lacto-phosphates,* as well as the easily assimilated diets which contain them. Every day the phosphates and other salts are excreted by the perspiration, the fæces and the urine, and in the latter especially there is a large excretion as a coincidence or consequence, perhaps, of pregnancy. This does not imply that lime-salts are too abundant. It does not mean lack of nutrition or assimilation of the existent element, but a natural process; not an excess but a waste of matter which has become incompatible with digestion; and instead of indicating that the system has too much lime, or will not appropriate what it has, it shows a direct need for it. Blacke, of Paris, in experimenting upon the action of the phosphates, submitted a pigeon to the test of food in which they were absent. Its appetite, weight, and activity were diminished, and the fact may be noticed that it excreted more phosphates than it absorbed. The rapid loss clearly indicated the need of lime-salts, and when these were furnished they were assimilated, in spite of the quantity being excreted, and the pigeon regained its appetite, weight and activity. In face of the evidence we possess, it would be a disastrous theory to propagate the idea that diet has no direct influence upon the origin as well as the development of the teeth. The consulting embryologist of the future will go further. He will at least do as much as the Grecians did, by keeping his patients under the impressionable influence of art, music, and sculpture. The medicines for the mind will be as much investigated as those for the body; the value of sunlight and sun-baths, of scrupulous cleanliness of body and repose of mind,—the antidotes to modern nervousness. These will be made to contribute to the growth and development of the embryo. We live in an age when the most amazing revolutions in science and discovery are received with almost perfect complacency, and it would not startle us if some modern Alphonso of Castile, who said he could have made the world better had he been consulted, would really demonstrate his ability to improve the human embryo.

I would like information upon one point. Anyone who has examined the deciduous molars previous to eruption may have found structural defects,—fissures in the grinding surfaces that look exactly like fissures found in the same teeth erupted for months. Of course, this examination must be *post mortem*, so far as the human teeth are concerned; but the investigation might be made upon dogs by vivisection. The frequency of caries in the first permanent

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* One tablespoonful every day for a month, then discontinued for a month, as advised by Dr. Cushing, Chicago.

molar, especially in the lower jaw, has been shown by Magitot, in 10,000 cases, to exceed that of any of the other teeth; while in 1,000 cases in the temporary set the same tooth in the same jaw is most frequently carious. Our lamented friend, Dr. T. B. Hitchcock, published in the *Canada Journal of Dental Science*, in 1871, a comparison of this table, prepared from his own record of 10,000 cases. While it varied in some respects, its conclusions were the same with reference to the greater frequency of decay of the lower first molars. Several theories have been proposed to account for this fact, the most popular being that the period of intra-maxillary evolution of these teeth is so prolonged and coincident with a period most likely to be disturbed by diseases,—in the case of the deciduous teeth, of the mother; in the case of the permanent, of the child. With our present knowledge this seems reasonable. But if we consider the character of the superimposed gum, which for months before eruption is tense and inflamed, can it be possible that, as the result of the local irritation, the normal character of the mucus obtains an acid reaction, and that this and other acids may reach the crown of the undeveloped tooth, and slowly act upon the lime-salts of the enamel in imperfectly calcified fissures? Nasmyth's membrane would not protect the fissures, because we now know that it can be penetrated by acids. It is easy to understand why acids would thus act in the fissures of molars when it would not in the smooth surfaces of the other teeth. The condition of a child's mouth in febrile states of the body, the irritation peculiar to that part where so many teeth are growing, must vitiate the buccal fluids. I was surprised, in testing the saliva of nursing children before the eruption of the teeth, to find a decided acid reaction in every case. Infants do not swallow every particle taken into the mouth. The cheeks, the maxillæ folds, the tongue, retain portions of soft food, and these sour and become acid. One of the national customs among the French Canadian peasantry is to put a small cloth bag of bread and sugar, soaked in milk, into the mouths of infants to keep them quiet. Frequently the result is to cause vomiting and an excess of acid in the stomach. I doubt if it is generally realized to what extent acids are present in the mouth before the eruption of the teeth. Now, I venture to believe that just as easily, if not more so, as iodine and aconite painted on the gums can reach and act upon the periosteum, these acids can reach and act upon the crowns of the undeveloped molars.

As I propose in a future paper, with your permission, to discuss the specific result of the diseases of pregnancy and infancy in their effects upon the teeth, I will not allude to the subject here. To my mind, neither physicians nor dentists will ever do all that could or

should be done. It remains with the mothers to learn more about the origin and development of the teeth, and to take as much interest in the embryology of their future offspring as they do in house-plants which they grow from the seed, or as some do in the breeding of pug dogs.

The care of children's teeth after eruption ought to occupy more attention. It falls naturally upon the mother; but it ought to occupy as much of our thought as treatment. Every one of us has seen hundreds of disheartening cases; children of eleven and twelve years having twenty or more carious cavities in the teeth,—that discouraging decay between the lower incisors which marks caries of embryonal origin. It is remarkable how the large proportion of these cases can be traced back to disturbances and diseases during pregnancy, or in the early months and years after birth.

One of the best means to make parent and child value the teeth which should last forever is to make them realize the importance of those which should last for six or seven years, during which time the child is entirely dependent upon them for mastication. Every mother ought to know the process by which the deciduous teeth are removed by nature. My experience is that most parents think they are shed as a canary gets rid of its feathers, or a deer its antlers. Some imagine that they are lost as a crab loses its shell; or that it is a process of moulting, to be continued at intervals during growth, like that of the lobster. People are prepared to believe anything about anything of which they know nothing, and they ought to be surprised by being taught the truth.

The popular superstition that the deciduous teeth are only of temporary importance, and that their premature loss is only one of appearance, not of function, like all superstitions, was founded upon ignorance, and is receiving its death-blow in this country. But, as a rule, the first eight or twelve years of a child's life is too often a time of neglect, so far as the teeth are concerned; and if there is any time when every tissue and organ should have the utmost care, it is when they are in rapid growth, when vitality depends upon what goes into the mouth, and from the mouth into the stomach. As a rule, children are never taught the object of their teeth and the need for their exercise. Example in this fast age of quick eating is rarely given, for it may be said of most of us, as Plato said of the citizens of Agrigentum, "They eat as if they had not an hour to live." Mere eating is not mastication. Let this be the first idea of the function of the deciduous as well as of the permanent teeth,—that they are intended as human mills to prepare the food for digestion, and that as machinery rusts out quicker than it wears out, so teeth which are not exercised by mastication are more predisposed to

decay than those which have plenty of hard food to grind. The lessons of hygiene are so simple that they are rarely observed, just because of their simplicity,—daily use of the badger-hair tooth-brush, precipitated chalk, and castile soap. Mothers ought to have mouth-mirrors, and ought to examine the child's teeth every month of every year. I have seen children who have looked forward to the eruption of a tooth as a happy event in their lives. Why should not this be a life-lesson of pleasure to a child from the time it has intelligence enough to watch for its dental development? It is taught to take care of its hair, its skin, its nails, its toes, its eyes. A child's deciduous teeth are as much a work of the Creator and as important for the time being as the health of its hair, its skin, its nails, its toes, or even its eyes. If nature made any mistake, however, it was in giving us so many teeth that they are not only undervalued, but so easily replaced. If a child had twenty eyes and only two teeth, the custom which governs so many parents in the care of them would be reversed, especially if the twenty eyes were temporary, to be replaced by thirty-two successors, and the two teeth had to be carried to the grave. If we cannot grow better teeth for children, we must do more than we have yet done to keep the poor ones they have. Even in this direction, I feel we will never be able to do the best for their teeth until the great discoverer comes with the permanent translucent soft filling. Children, even of an older growth, will then have one of the miseries of life ameliorated, and the structural poverty we regret will be met by some after compensation that will do much to lessen the need for prosthetic dentistry.

I should have concluded long ago, but I must do so now, and with reiterating my conviction of my own ignorance. Confucius has a fine thought: "What you know, to know that you know it, and what you do not know, to allow that you do not know it,—that is knowledge." I have tried to show you how little I know that I may the sooner know more. No doubt you will assure me that in this I have splendidly succeeded.

Dr. Rich. The subject of this paper is one that has occupied my most earnest attention for the whole of my professional life. Over and over again, in the meetings and conventions of dental societies, I have endeavored, by every means in my power, to impress upon the minds of dentists the fact that it was their business to see that the children that were to be born had good sets of teeth. The means of ascertaining how those sets of teeth could be made good is very simple, and have many times been stated. I have myself stated them over and over again, and written treatises upon the subject, and given facts to prove that there is no necessity for the

existence of delicate teeth, provided proper means are used to produce strong ones. I have contended, over and over again, that it is the business of every dentist to turn himself into a missionary for the purpose of producing good, strong sets of teeth. Now, we can only achieve an object of such great importance by going to the place where this child was formed, because delicate teeth are entirely the result of the condition of the mother's health while she is bearing that child, and her condition before she became pregnant. Take the wild tribes of men, the members of the lower orders of society, and the hard-working peasants, and you will find that these classes, in almost every country, have fine, strong, splendid teeth. Why is that? It is simply because the mother takes a large amount of physical exercise, and uses every means in her power to produce the highest condition of physical health. Oftentimes this exercise is forced upon her by her master, the man; but there are conditions of society in some parts of the world where it becomes a pleasure for women to achieve a high condition of health, and there the teeth of the people are the most perfect of any found among civilized races. Experiments have been made under the auspices of the French government which proved conclusively that by increasing the health of the mother during pregnancy a marked effect is produced upon the teeth of the child. Fine teeth depend upon fine health in the mother, and the mother must take every means in her power to produce a high condition of her health, so that all the secretions shall be in the most perfect condition possible. The means of producing a high condition of health are not at all unknown. The benefit of vigorous exercise, proper diet, and other means of promoting a high condition of health, are well known. Yet how few mothers of our generation practice anything of the kind! Look at the mothers in any highly civilized community, and what are they? Are they fine animals, such as we would breed fine race-horses from? Not a bit of it. They are delicate in frame, poorly developed, with soft muscles; they faint away at every touch, and are neither able to take care of themselves nor their children in any emergency. That condition of the mothers is the cause of delicate teeth. Fine, athletic, strong women do not produce children that have bad teeth. It is one of the duties, and ought to be one of the objects, of dentists to promote the production of good teeth by impressing upon women who are to be mothers the importance of attaining and preserving, by the means which are well known, a high condition of health during pregnancy. This is not the first time I have advocated this theory, and called attention to this fact. At one period of my life, and for several years, I devoted my whole energies to this subject. I found that mothers who had produced

children having delicate teeth, and who subsequently changed their mode of living and pursued a course of exercise and regimen which promoted their health and increased their vital energies, would always thereby produce a marked effect upon the teeth of their future children. This result is reasonable and philosophical. If we want fine animals, we breed from a fine animal. Who ever heard of a fine horse being produced by a miserable dam? There may be a scallawag father; but it is always necessary to have a fine dam in order to produce a fine horse. This principle exists throughout the whole animal kingdom, not excepting man. The formation of teeth is governed by certain physical laws that are well known, and that have been drummed into our minds for ages, and we take no notice of them. The people who take the least notice of them are the dentists. Who ever heard of a dentist telling a woman that her imperfect teeth were the result of a poor physical condition, and that if she desired her children to have good teeth she must take care of her own health, as well as that of her children after their birth and during their early years? Yet every man who does not so instruct his patients is derelict in his duty; the dentist who does not make himself a missionary on that subject is derelict in his duty. In my long experience in the matter of physical training and the improvement of health by a judicious regimen, I have found that there is scarcely a woman, no matter how delicate she may be, provided there is no organic difficulty, but may be made a fine, healthy specimen of humanity. If we would devote our attention to that point with the same earnestness that we do to almost everything else connected with our profession, there would be a marked result produced upon the coming generation.

Further discussion of Dr. Beers's paper was postponed until the next meeting of the society.

Adjourned.

E. T. Payne, D.D.S., *Secretary.*

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

Regular monthly meeting, held Tuesday evening, January 6, 1885, in the rooms of The S. S. White Dental Manufacturing Co., corner of Broadway and Thirty-second street.

The president, Dr. A. L. Northrop, in the chair.

Dr. C. F. W. Bödecker, chairman of the Clinic Committee, reported that at the clinic in the afternoon there was an attendance of about sixty. Dr. T. K. Low, of Butternut Grove, Delaware Co., N. Y., had there a new anesthetic, which, for want of a patient, he

did not demonstrate. An agent from McKesson & Robbins's drug house was also present with some oleate of cocaïne, four per cent. solution. He claimed that the aqueous solution kept its strength but about two weeks. Dr. Weber, a pupil of Dr. Wilhelm Suersen, of Berlin, presented a patient with a lesion of the soft palate restored by an obturator which had been worn by the patient for one month. He described the apparatus as being an application of the principle introduced many years ago by Dr. Suersen. It consisted of a plate of hard vulcanite across the roof of the mouth, to the posterior end of which was a bulb, also of hard rubber, which filled the cleft of the defect. It had also, on the upper surface of the bulb, a loop. Dr. Weber described the loop as not being essential to correct articulation, but of great advantage to patients who in the beginning have some difficulty in adjusting the apparatus. The advantages claimed for the Suersen obturator are easy construction, perfect articulation, and great durability.

Discussion.

Dr. N. W. Kingsley. I have treated hundreds of cases of cleft-palate with both obturators and artificial vela, and I have never seen in any case the difficulty which Dr. Weber says this loop is intended to remedy. My criticism upon the apparatus before us is that it is too large, and will tend to produce the nasal sound which he describes, instead of correcting it. If there is a tendency to catarrhal secretions and collections of mucus, it will clog the passage, and thereby interfere with the speech. The patient being a foreigner, we cannot judge in regard to her articulation with the same accuracy that we might in the case of an American. She says she cannot read, and part of her difficulty of speech is due to her nationality, and for that we must make allowance. If English were her native tongue, her articulation would sound as if she had a cold in her head. You may not detect it now, because her speech is the speech of a foreigner. There is no question that there is a marked difference in her speech with it in and with it out. Some one asks how I would support an obturator when there were no natural teeth? I should insert artificial teeth, and depend upon an undercut above the palatine bone to support the teeth. I should not expect to get any hold where the muscles were all the time working. In that respect the artificial velum is preferable, because it yields, but with an obturator there is no yielding to the action of the muscles.

Dr. Weber. It is not my intention to present this as *my* method, but to show that it was a splendid idea of Suersen's.

Dr. Bödecker. Nobody has seen such an obturator here.

Dr. Kingsley. There stands my assistant, who has seen forty of them, at least. I have been using the same principle in certain cases for many years.

Dr. Weber. Some patients speak quite well directly after the application of this apparatus, and some, after a time, articulate perfectly.

Dr. Kingsley. Is this a case of congenital cleft-palate, or acquired?

Dr. Weber. It is acquired.

Dr. Kingsley. Then, gentlemen, I would call your attention to something which is of the utmost importance in cases of this kind: Where the patient has once had the faculty of distinct articulation, you can put in any kind of an appliance, no matter how inferior it is, and benefit the speech. I did not observe this patient's mouth until this moment. I see it is not a case of congenital cleft-palate, but one of acquired lesion, where it is not necessary to put in a bulb of this kind at all. All my previous remarks were made upon the supposition that this was a case of congenital cleft. If you will put in a simple obturator to cover this opening, you will get precisely the same result as you have now; there is not the slightest necessity in this case for this bulbous attachment. Twenty years ago, in London, I was discussing *congenital* cleft-plate before the Odontological Society, and when I closed my remarks, Mr. Sercombe arose and said, "I see nothing peculiar about this;" and he then went on to state a case where he had applied an instrument and distinct articulation followed immediately. For a moment it seemed as if the wind were all taken out of my sails, when Sir Edwin Saunders, who was then president of the society, inquired, "Will the gentleman be kind enough to tell us whether that was a case of congenital cleft-palate or acquired?" He then replied that it was acquired. "Then," said the president, "your case has no reference to the subject under discussion." It is well known that a very simple arrangement will produce the desired result in cases of acquired lesion; but if any of you suppose you can put an apparatus of this kind in the mouth of a person who has *congenital* cleft-palate, and produce as marked a change within a month as there is in the case before us, you will find you are mistaken. It never has been done yet. I have introduced appliances in cases of acquired lesion like this, and have found that the difficulty of speech was instantly corrected; it does not take a month. The simplest kind of an apparatus that will go back and cover the opening, although it may be as thin as paper, will restore the speech immediately. I will guarantee to take this patient and produce the same result that has been obtained here, by applying a simple obturator without any such bulb at all. I would not attempt to put in an artificial velum in a case of acquired

lesion like this. I would always put in an obturator. As we are here to get light, will Dr. Weber permit me to saw off the top part of the bulb, and let us see what effect, if any, it will have upon the patient's speech?

Dr. Bödecker. This is merely temporary.

Dr. Kingsley. No matter; we see the effect it has, and by removing the bulb we can see whether this particular form of appliance is necessary in these cases.

Dr. Bödecker. He said it was necessary to begin with, until the patient has become accustomed to speaking.

Dr. Weber. It is made for the beginning; afterwards it is not necessary to have it on.

Dr. Kingsley. If you will allow me to cut the entire bulb off down to the sixteenth of an inch in thickness, you will find she will articulate just as well as she does with it on. If her speech is injured by it, I will make her a new piece,—either one like this, or anything else; she shall not suffer from it. Personally, I care nothing about it. It is not to satisfy myself; but I would like to remove it, in order to show others that it is of no use.

Dr. Weber declined to have the piece cut.

Incidents of Office Practice.

Dr. W. D. Tenison. The conclusion I have arrived at, from my own and reported experiments with cocaïne, is that this remedy is of little value unless injected. I have used it with the rubber-dam, drying the cavity thoroughly, and it had no effect. In other cases, the patients said they did not feel quite so much pain. I have used it in cases where the rubber-dam could not very well be applied, and where the fluids of the mouth got into the cavity of the tooth with it, and in some of those cases the patients thought the pain was very much lessened. I concluded that a good deal of that was in the imagination of the patient. We all know that when we use the rubber-dam, and the tooth is thoroughly dry, after excavating beyond a certain point, the patient does not feel as much pain as when we commenced. I am about as much at sea with regard to the value of cocaïne, when applied to tooth-substance, as I was before I experimented with it.

Dr. Bödecker. I have used cocaïne in a number of cases,—with good results in some, in others not. A physician informed me that in some dispensaries they have used it by injecting a drop or two in the vicinity of the inferior dental nerve, and were able to remove quite a number of roots, in different instances, without any pain whatever. I have used it a great deal in minor operations, such as

opening abscesses, etc., and I have found that it generally lessened the pain very materially.

Dr. Atkinson. I have had some experience with cocaïne, and I know it is no humbug. I lately made an operation in which I went into the inferior dental canal on the right side, from the site of the transverse process between the second bicuspid and first molar, tracing the entire canal back to the posterior border where it turns up and escapes from the ramus. Before applying cocaïne the patient could not bear to be touched, either on the face or gums, without having a "tick," as she called it, which is a very old and significant name for the sensation. Yesterday I saw her again, and she said the "tick" was not entirely gone, but there was no heavy shock. Mr. Charles S. Tomes saw the case immediately after the operation, which consisted in rasping down the entire alveolar border to the permanent part of the bone. I put, say, ten or fifteen drops of cocaïne on a piece of cotton, down into the chamber where the operation had been made, there being no dressing in it, and held it there for five minutes. I then touched it with an instrument and asked if she felt it. She said, "Yes, I feel it, but it does not hurt." I repeated the dose, using a ten per cent. solution that I made myself from distilled water and the alkaloid, and I know it was not deteriorated. The peculiar feature of the case was, that while the patient could feel the instrument there was no pain, although I burred to my satisfaction and thoroughly along the canal to get at the posterior foramen ; then turned to the thin portion of the process and burred that off until I reached the soft tissues on the inside. The solution does not wholly remove sensibility. It produces insensibility to pain, but the tactile sensation seems to remain. In the case of this lady the exsection of the nerve was first made in August last, in the territory where the inferior dental nerve comes out of the mental foramen, and that territory has been numb ever since, except as to tactile sensation. She could tell when one or two points of the pliers were placed upon that locality at some distance apart as readily as she would if placed upon the well side. Therefore, the idea was suggested whether there was not an abnormal connection through some other sensory nerve with this part of the face. Wherever we can get this agent absorbed in the neighborhood of a sensory nerve, we do get local anesthesia against pain.

Dr. Tenison. Do you get anesthesia in the tooth-structure ?

Dr. Atkinson. I have, in a case where I put it in four teeth,—two bicuspids and two molars. It operated so nicely, that the patient would not believe the excavating had really been done. But I do not think we can rely on that in all constitutions. I prefer to make the operation of excavating right in the fluid. I have not used it in

any case yet where I put on a rubber-dam. For removing children's teeth it is just the thing. It quiets the local trouble, so that you can pick them out without difficulty. I have not yet had a case of really exposed pulp on which to test it.

Dr. Tenison. I have extracted one tooth, for a very nervous patient, applying cocaïne, and the patient said she felt no pain.

Dr. Atkinson. In regard to recovery from the effects of cocaïne,—I have had no case under my own observation, and I have read of no case, in which all the sensation was not dissipated in from fifteen minutes to two hours. It was used very vigorously in my own mouth at Springfield, and I only felt a stiffness of the right side of the tongue and the pharynx for most of the day. After I slept I do not think I noticed any unusual sensation. We have records of cases where fifteen grains have been taken by a human being, the only result being intoxication.

Dr. Northrop. I know of an instance where it has been used for nearly six weeks, in a case of uterine cancer, for the purpose of keeping the person from suffering. It has kept her quiet, and she has had no ill effects.

A paper was then read by Dr. J. L. Williams, of New Haven, Conn., entitled "Molecular Structure and Force with Reference to Nutrition." *

Adjourned. B. C. Nash, D.D.S., *Secretary.*

SOUTHERN DENTAL ASSOCIATION.

The Southern Dental Association will hold its seventeenth annual meeting in the city of New Orleans, at Tulane Hall, Dryades street, between Canal and Common streets, commencing the last Tuesday (31st) of March.

The Exposition, together with cheap traveling rates, will, no doubt, induce a large attendance, and the meeting will be one of unusual interest and profit.

Much of the session will be taken up with clinics, and those attending may expect a rare treat, as some of the foremost men in the profession will be present for that purpose.

The committee of arrangements will see that ample provision is made for the accommodation of visiting dentists.

Those wishing to engage rooms in advance will correspond with Dr. J. R. Walker, chairman committee of arrangements, corner Baronne and Common streets, New Orleans, La.

J. L. Fountain, *Cor. Sec.*, Bryan, Texas.

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* See page 129, current number of the Dental Cosmos.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The third meeting of the National Association of Dental Examiners will be held at New Orleans, on Tuesday, March 31, 1885.

All State Boards not already members of this association are earnestly invited to send representatives to this meeting.

Geo. H. Cushing, *Secretary.*

CALIFORNIA STATE DENTAL ASSOCIATION.

The sixteenth annual meeting of the California State Dental Association will be held in San Francisco, commencing the first Tuesday in August, 1885, and continuing five days.

The following are the officers:

A. Warner, D.D.S., president; W. F. Griswold, vice-president; S. E. Goe, D.D.S., secretary; H. E. Knox, D.D.S., corresponding secretary; S. E. Knowles, M.D., D.D.S., treasurer; J. A. W. Lundborg, librarian.

VERMONT STATE DENTAL SOCIETY.

The ninth annual meeting of the Vermont State Dental Society will be held at Burlington, Vt., commencing Wednesday, March 18, 1885, and continuing three days.

A cordial invitation is extended to members of the profession in this and adjoining States to be present.

Thos. Mound, *Secretary*, Rutland, Vt.

VERMONT STATE BOARD OF DENTAL EXAMINERS.

The Vermont State Board of Dental Examiners will hold their third annual meeting at the Van Ness House, Burlington, Wednesday, March 18, 1885, at 10 A. M.

Applicants for license are requested to report promptly at that time.

R. M. Chase, *Secretary*, Bethel, Vt.

IOWA STATE DENTAL SOCIETY.

The twenty-third annual meeting of the Iowa State Dental Society will convene in Des Moines, on the first Tuesday in May, continuing four days. This meeting is expected to be one of the best in the history of the society. A cordial invitation is extended to members of the profession from other States.

Des Moines is centrally located, easy of access, and has splendid hotels and many attractions, which will make this a pleasant as well as profitable vacation for dentists.

J. B. Monfort, *Secretary*, Fairfield, Iowa.

EDITORIAL.

THE INTERNATIONAL TOOTH-CROWN COMPANY'S CLAIMS.

In the Dental Cosmos for October, 1884, page 640, we published, without comment, a letter from Dr. William H. Dwinelle, president of the American Dental Protective Union, purporting to be a statement of proceedings in the United States Circuit Court, and which we believed to be a mere recital of undisputed facts; not thinking for a moment that a gentleman of Dr. Dwinelle's intelligence could have been mistaken, and confident that he would not knowingly misrepresent.

We have received a communication from Messrs. Dickerson & Dickerson, attorneys for the International Tooth-Crown Company, complaining of the injustice done to their clients by said publication; denying the truth of the statements; claiming that "at no time were any patents owned by the International Tooth-Crown Company invalidated in any court;" and affirming that "no question of fraud in obtaining the licenses was raised in the case."

In accordance with the suggestion of the Messrs. Dickerson, we have communicated with Mr. Solomon J. Gordon, attorney for the American Dental Protective Union, and also with Dr. Dwinelle, requesting them to correct any errors which the article in question may have contained.

Dr. Dwinelle informs us that, instead of stating that the patents were invalidated, he should have said "were shown to be invalid." Mr. Gordon's reply affirms the propriety of this modification of Dr. Dwinelle's language.

Dr. Dwinelle further informs us that he did not intend to assert that "the licenses were shown to have been obtained by fraud, but only to make that allegation as to the patents."

So far as we are able to ascertain, no charge of fraud in obtaining the licenses was made, and, as the hearing in question was only preliminary, it is proper for us to add that no final decision has yet been rendered upon the validity of the patents or upon any of the questions at issue.

It is hardly worth while to say that the Dental Cosmos has no desire to mislead its readers on any subject, nor to allow its pages to be used for such purpose; and that it regrets that, even inadvertently, an erroneous statement should have appeared in its pages. It assuredly would not intentionally induce any one to infringe a patent-right to his own injury. The International Tooth-Crown Company is entitled to Dr. Dwinelle's disclaimer. With the desire to present the actual facts, we cordially invited the Messrs. Dickerson to make

a statement of the case over their own signature; but, as they have not availed themselves of the opportunity, we have thus endeavored to set the matter straight before our readers.

BIBLIOGRAPHICAL.

THE PRINCIPLES AND PRACTICE OF DENTISTRY, including Anatomy, Physiology, Pathology, Therapeutics, Dental Surgery and Mechanism. By CHAPIN A. HARRIS, M.D., D.D.S., etc. Eleventh edition. Revised and Edited by FERDINAND J. S. GORGAS, A.M., M.D., D.D.S., author of "Dental Medicine," editor of Harris's "Dictionary of Medical Terminology and Dental Surgery," professor of the Principles of Dental Science, etc., in the University of Maryland. With 2 full-page plates and 744 other illustrations. Royal 8vo., pp. 994. Philadelphia: P. Blakiston, Son & Co., 1885. Price, cloth, $6.50; sheep, $7.50.

The first edition of this book was published in 1841; the last (tenth) edition was issued under the editorship of the late Dr. P. H. Austen.

Nearly fourteen years having elapsed since that revision, the rapid advances made during that period have necessitated another, which, as stated in the preface, was undertaken by Prof. Gorgas at the request of the publishers and of the author's family, involving, as he claims, more than a year's labor. Many changes have been made in the arrangement of topics; new chapters have been added; the number of illustrations has been greatly increased, and much that had become obsolete in theory and practice has been omitted.

Of the omissions, it is only necessary to say that good judgment has been exercised in expurgation.

Of the many valuable additions, the most considerable are under the heads of irregularity of the teeth, preparation of natural roots for attachment of artificial crowns, and vulcano-plastic work; but many other notable and valuable additions have been made throughout the volume.

The book is divided into four parts, treating respectively of anatomy and physiology, pathology and therapeutics, dental surgery, and dental mechanics. The literature of the profession has evidently been diligently searched, and we can scarcely recall a plausible theory which has been suggested, or an improved appliance or method which has been devised, within the last decade, that has not received more or less notice by the editor. There has evidently been an earnest and conscientious effort to incorporate in this volume all that belongs to a text-book of dentistry. It is sufficiently ele-

mentary for the student, while at the same time a reliable guide to the practitioner.

This new edition of Harris is so far ahead of all previous editions that it should be in the possession of every dental student, and there are few practitioners who can afford not to number it among their possessions.

It would not be difficult to criticise some of the teaching. No volume of this extent was ever written which was not open to criticism, and none such will ever be written that, in all respects, will find indorsement by any one individual. But, in the main, the instruction conveyed is reliable, the methods taught are such as are approved by some at least of those who are considered as authorities; and, until the time comes when all authorities shall agree upon all points, universal indorsement is not to be expected. We think, however, that all unprejudiced readers will admit that the eleventh edition of Harris is a volume of which the dental profession may not feel ashamed.

A System of Practical Medicine by American Authors. Edited by William Pepper, M.D.; assisted by Louis Starr, M.D. Vol. I.—Pathology and General Diseases. Philadelphia: Lea Brothers & Co., 1885. For sale by subscription only. 8vo., pp. 1094. Cloth, $5.00; leather, $6.00; half Russia, $7.00.

This is the initial volume of "A System of Practical Medicine by American Authors," edited by the able professor of theory and practice in the University of Pennsylvania, assisted by the clinical professor of diseases of children in the Hospital of the University.

This work, which has been in preparation for several years, is to comprise five volumes of about 1000 pages each. All of the articles are to be furnished by American physicians of recognized authority in their several departments, thus presenting a comprehensive and thoroughly practical system of American medicine.

The ground plan, so to speak, of the enterprise has been carefully prepared; the selection of authors—including the most eminent practitioners and specialists—has been judiciously made, and the "System," when completed, promises to be the best representation yet offered of modern medical science as taught and practiced in the United States of America.

Noticeable features of the volume before us are the omission of extended discussions of controverted questions and of theoretical views, and the concise and clear description of disease, of diagnosis, and of treatment, which it seems to have been the ambition of the several authors to supply. We congratulate the publishers, editors, authors, and the profession on the conception and execution (thus far) of this great undertaking.

The volume before us contains the following articles:

General Morbid Processes, by Reginald H. Fitz, M.D.; *General Etiology, Medical Diagnosis and Prognosis*, by Henry Hartshorne, M.D., LL.D.; *Hygiene*, by John S. Billings, A.M., M.D., LL.D. (Edin.); *Drainage and Sewerage in their Hygienic Relations*, by Geo. E. Waring, Jr., M. Inst. C. E.; *Simple Continued Fever, Typhoid Fever, Typhus Fever*, by James H. Hutchinson, M.D.; *Relapsing Fever*, by William Pepper, M.D., LL.D.; *Variola*, by James Nevins Hyde, M.D.; *Vaccinia*, by Frank P. Foster, M.D.; *Varicella*, by James Nevins Hyde, M.D.; *Scarlet Fever*, by J. Lewis Smith, M.D.; *Rubeola, Rotheln*, by W. A. Hardaway, A.M., M.D.; *Malarial Fevers*, by Samuel M. Bemiss, M.D.; *Parotitis*, by John M. Keating, M.D.; *Erysipelas*, by James Nevins Hyde, M.D.; *Yellow Fever*, by Samuel M. Bemiss, M.D.; *Diphtheria*, by Abraham Jacobi, M.D.; *Cholera*, by Alfred Stillé, M.D., LL.D.; *Plague*, by James C. Wilson, A.M., M.D.; *Leprosy*, by James C. White, M.D.; *Epidemic Cerebro-Spinal Meningitis*, by A. Stillé, M.D., LL.D.; *Pertussis*, by John M. Keating, M.D.; *Influenza*, by James C. Wilson, A.M., M.D.; *Dengue*, by H. D. Schmidt, M.D.; *Rabies and Hydrophobia, Glanders and Farcy, Anthrax* (*Malignant Pustule*), by James Law, F.R.C.V.S.; *Pyæmia and Septicæmia*, by B. A. Watson, A.M., M.D.; *Puerperal Fever*, by William T. Lusk, M.D.; and *Beriberi*, by Duane B. Simmons, M.D.

A MANUAL FOR THE PRACTICE OF SURGERY. By THOMAS BRYANT, F.R.C.S., member of the Council and Court of Examiners of the Royal College of Surgeons, etc. With 727 illustrations. Imperial 8vo., pp. 1039. Philadelphia: Henry C. Lea's Son & Co., 1885. Price, cloth, $6.50; sheep, $7.50.

This last edition of a well-known surgical manual has been thoroughly revised, brought up to date, and can fairly claim to rank with the manuals of Ashhurst and Holmes as a guide to the student and as an epitome of surgical science for the practitioner. Mr. Bryant's well-known reputation as a careful, conservative, but able practitioner, and his very large experience both in private practice and as one of the attending surgeons at Guy's, entitle all his utterances to respectful consideration; but we are surprised to find that at this day and in the light shed upon surgery by the aseptic system during the last ten years, he is not only willing to say that "the Listerian mode of dressing has had its day," but to speak scoffingly of the whole theory of aseptic surgery, and of the theories upon which it rests. It would be safe to wager that, like the majority of its opponents, he has never given it a fair trial.

The section on the teeth was written by Mr. Henry Moon, and is, therefore, as might be expected, much superior to the articles on

that subject in most other manuals or treatises on general surgery. Indeed, exclusive of the chapter on the teeth in Agnew's "Surgery," we do not know of a more concise or more reliable resumé of the surgical relations of the teeth than is contained in these twenty-four pages. The rules for extracting, the causes and treatment of decay, the inflammatory affections of the pulp, the correction of irregularities, the reflex troubles connected with the teeth are all succinctly and clearly described, and render the book especially valuable to the dental practitioner. It is written in a smooth, readable style, and is typographically everything that could be desired.

The Science and Art of Surgery: A Treatise on Surgical Injuries, Diseases, and Operations. By John Eric Erichsen, F.R.S, LL.D., F.R.C.S. Eighth edition, revised and edited by Marcus Beck, M.S. and M.B., London, F.R.C.S. With 984 engravings on wood. Vol. II., octavo, pp. 1205. Philadelphia: Henry C. Lea's Son & Co., 1884. Price, cloth, $4.50; sheep, $5.50.

The first volume of this noble work was noticed in the Dental Cosmos for December. That now before us gives like evidence of a careful and thorough condensation, and of many, various, and valuable additions, including all the advanced methods of modern practice. This volume includes chapters on diseases of the head; of the jaws and their appendages; of the mouth and the throat, and plastic surgery of the face and mouth. Erichsen's Surgery is so well known and so highly esteemed, by both American and English practitioners, that it is needless to occupy space in eulogy of it. It is sufficient to say that there is a new edition of it on the market.

Dental Surgery for Practitioners and Students. By Ashley W. Barrett, M.B., Dental Surgeon to the London Hospital. 12mo., pp. 83. Philadelphia: P. Blakiston, Son & Co., 1885. Cloth, $1.00.

In this little volume of eighty pages the author has endeavored to present, under nine general and fifty-two sub-headings, the substance of what, for several years, he has, as he informs us in the preface, been teaching to students of medicine in the dental department of the London Hospital. The author hopes "that this small book may prove useful to the busy medical practitioner too much occupied to study larger and more exhaustive works on dental surgery." A little knowledge is said to be a dangerous thing, but if a medical student or practitioner is ambitious to know anything whatever about dental matters, he cannot hope to obtain such knowledge in less compass than in this small volume.

The New Local Anesthetic: Hydrochlorate of Cocaïne (Muriate of Cocaïne), and Etherization by the Rectum. By Laurence Turnbull, M.D. Illustrated. Philadelphia: P. Blakiston, Son & Co., 1885. pp. 74. Price, paper, 50 cents.

This pamphlet, prepared as an appendix to Dr. Turnbull's Manual of Anesthetics, is intended to present all that is known of the new local anesthetic up to the present time,—its history, preparation, and medical, surgical, and dental uses; its influence on man, etc. An addition of eighteen pages is devoted to a history of etherization by the rectum, with a list of the cases, so far as known, in which that method of producing insensibility has been resorted to.

One Hundred Years of Publishing. 1785–1885. Philadelphia: Lea Brothers & Co., 1885.

This is a neat little memorial volume commemorative of a century's existence of the business of the firm whose imprint it bears. The house was founded by Mathew Carey in 1785. At its inception, and for a long period, the business was devoted to issuing periodical publications and miscellaneous literature. The house has been styled at succeeding epochs, Carey & Lea, Lea & Blanchard, Henry C. Lea, Henry C. Lea's Son & Co., and now Lea Brothers & Co. The business has for many years been confined exclusively to medical publishing. The reputation of the house justifies the statement that "it has ever entertained a high sense of respect for its own imprint, and has felt a just pride in the belief that its name on a title-page was in some sort an indication of the worthiness of the volume in which it appeared."

Smith's Diagram of Parliamentary Rules, together with Key Containing Concise Hints and Directions for Conducting the Business of Deliberative Assemblies. By Uriah Smith. Second edition, revised, pp. 34. Battle Creek, Mich.: Review and Herald Publishing Association, 1883. Price, cloth, 50 cents.

A very convenient and concise diagram and manual of hints and directions for conducting the business of deliberative bodies, which will be found useful for members and officers of such organizations. It contains much needed information condensed into a small compass.

Pamphlets Received.

A Method of Treating Fractures of the Inferior Maxilla. By Walter Campbell, L.D.S., Eng., Dundee. Read at the annual meeting of the association, August 29, and reprinted from the "Journal of the British Dental Association" for November, 1884. London: John Bale & Sons, 1884.

Dental Jurisprudence. By Richard Grady, D.D.S. Read before the Maryland and District of Columbia Dental Association, at the meeting in Baltimore, October, 1883, and reprinted from the "American Journal of Dental Science" for January, 1884.

Outlines of Vegetable Histology. By Mrs. Wm. Streeter, President Section of Botany, R.A.S. Rochester, N. Y.: Davis & Leyden. Price, 50 cents.

Nozioni Intorno Alla Carie Dentale e sua Cura per Uso Degli Allievi Dentisti. Di Luigi Ribolla-Nicodemi, Docente di Odontoiatria, Membro dell' Instituto Odontologico di Francia, etc. Con figure Intercalate nel testo. Palermo, 1884.

Circulars of Information of the Bureau of Education, No. 6, 1884: "Rural Schools—Progress in the Past; Means of Improvement in the Future." Washington: Government Printing Office, 1884.

Department of the Interior, Bureau of Education: "Building for the Children in the South, by Rev. A. D. Mayo." Circulars of Information of the Bureau of Education, No. 7, 1884: "Aims and Methods of the Teaching of Physics, by Professor Charles K. Wead, A.M., of the University of Michigan." Washington: Government Printing Office, 1884.

OBITUARY.

WILLIAM MARGETSON, L.D.S., ENG.

DIED, January 29, 1885, at his private residence, Cliffe Terrace, Horbury, in his fifty-seventh year, WILLIAM MARGETSON, L.D.S., Eng., of Roscoe House, Dewsbury, Yorkshire, England.

WILLIAM BRAITHWAITE, M.D.

THE well-known English physician and surgeon, WILLIAM BRAITHWAITE, the founder of *The Retrospect of Medicine*, died at his home in Leeds, England, January 31, 1885, in the seventy-eighth year of his age.

The publication of the *Retrospect* will be continued by his son, Dr. James Braithwaite, whose name has appeared on its title-page connectedly with his distinguished father's for a quarter of a century.

PERISCOPE.

Physical Culture.—The common neglect of physical culture, not alone by students but by professional men generally, is the manifest cause of much of the dyspepsia, headache, biliousness, and other derangements of health which are usually ascribed to almost any other than their true origin. Comparatively few men—in professional life especially—utilize their "off" hours intelligently with reference to the nature of their daily duties, and the compensating character of the exercise demanded, in order to maintain both body and mind in normal condition. To no class of men, perhaps, does this statement apply with greater force than to dentists. No apology is needed, therefore, for occupying space in the Periscopic department of the current number for the terse but comprehensive presentation of this subject in an extract from the address by Dr. J. Wm. White at the inauguration of the new department of Physical Education, of which he has been elected director, in the University of Pennsylvania. We commend the lessons there taught to the present and prospective practitioners of dentistry as in the highest degree worthy of their attention and observance. It cannot be urged that this topic is not relevant; so far as the health, comfort, length of life, and that equable mental condition essential to the best work are concerned, there is none more so.

In ordinary parlance "education" is understood to mean simply acqirement of knowledge, or, in a somewhat broader sense, the development and strengthening, *i. e.*, the *training*, of the mind. The young man who is sent to college to "get an education" is sent there to go through a prescribed course of study, the result aimed at being either a certain amount of general culture or such special knowledge as shall fit him for the profession or business to which he proposes to devote his life. Until very recently this was the only idea which actuated parents or guardians, and was the only principle recognized by the managers or governors of educational institutions. Occasionally some unusually careful father would say, "See that my boy gets fresh air enough," or see that he doesn't "overwork himself;" occasionally faculties or trustees would interfere spasmodically with the athletics of the student, or as spasmodically encourage one game or sport to the exclusion of others. But there was no pretence, no thought even, of carrying on simultaneously with the education of the mind an education of the body, which should result in leaving the student at the end of his term of study better fitted physically as well as mentally to take his share of the troubles and hard knocks of the world and fight his way to success.

As time went on, however, and physiological science grew; as the mutual inter-dependence of mind and body was recognized; as the instances multiplied of the pale, sickly, narrow-chested valedictorian

or first-honor man, admirably equipped for his life-work with everything but health and strength, but, lacking them, easily distanced by less intellectual but more evenly developed competitors, or compelled to drop out of the race altogether, to dawdle through life as an invalid, or to die at middle-age; as such cases multiplied, I say, more and more attention began to be paid to the demands of the body, and more thought to the systematic satisfying of its requirements, until these questions have now become as important as any which are submitted to teachers or trustees.

We know as well as we know anything that in every occupation, calling or profession in which a man can be engaged, in every position in life which he can occupy, a fairly developed frame is not only of advantage to him, but is almost essential to success. We know with the same certainty that, *cæteris paribus*, the man who possesses health and strength is not only able to do better work than his rival who lacks those attributes, but he will do it more easily and pleasantly, with the greatest amount of comfort to himself and usefulness to his fellow men. Admitting this, then, we may ask what is meant by the "health and strength" which are such desirable possessions, and how are they to be obtained through any system of physical education?

Health consists, in a comprehensive sense, in such a condition ot growth and development of all the organs of the body as enables them to fulfill their functions easily and completely, respond promptly to occasional unusual demands upon them, and resist effectually the attacks of disease. It includes, therefore, in its very essence the idea of a certain amount of strength, and indeed the two terms are closely correlated, strength of the right sort and properly obtained being in the highest degree conducive to health.

In a system of physical education by which it is intended to produce these conditions certain elementary physiological facts have to be taken into consideration. The life of the body, as a whole, depends upon the life of innumerable atoms which constitute it, and which are continually dying, being cast off and replaced by others. The general health depends directly upon the activity of this process, and the perfection with which it is performed. The blood carries to every tissue or organ of the body the pabulum—the food—needed for its repair, or for its growth or development. If we lift a hand certain cells or atoms die, and are disintegrated as a consequence of that movement; new cells must be supplied to take their places; the old ones must be removed and carried to organs whose function it is to eliminate them from the body. All this is done by the blood, which, however, in performing this work necessarily becomes loaded with effete and useless material, much of which, in the shape of carbonic acid, is thrown off by the lungs. Reducing the statement to the simplest possible terms, we may say that the health and strength of any individual are in direct proportion to the thoroughness and celerity with which these cells or atoms are removed and replaced, and that, consequently, anything which promotes at the same time the destruction of the old cells and their rapid replacement by new ones is a valuable and beneficial agent. When we look for such an agent, throwing aside drugs as inapplicable and injurious, and recognizing food as the fuel which may be transformed

into force, but which is useless alone or unassisted, we find that there is but one means within our reach for safely and continuously and healthfully stimulating these processes into increased activity, and that means is exercise, probably the most useful, as it is the most neglected, of the hygienic and therapeutic forces.

Exercise, which may be defined as muscular contraction, acts in a manner readily understood. All movements of living beings are made by such contraction, *i. e.*, by the shortening of certain muscles. If you open your mouth, if you place one foot in advance of another, if you raise a finger, you do it in each case because a certain muscle or group of muscles in response to the stimulus of your will has shortened itself. This is true of all voluntary movements. Another set of muscles, of which the heart is the most notable example, contract in response to other stimuli and are not controlled by the will. In the case of the heart the stimulus is the presence of the blood itself, and particularly of the venous blood, or that which is brought back from the tissues loaded with carbonic acid.

As soon as any act of exercise is begun a number of the voluntary muscles are put into action; their contraction compresses the blood vessels and impels the venous blood actively toward the heart, which, thus spurred, contracts vigorously and sends the blood in large quantities to the lungs. Then the inspiratory muscles contract and lift the bony frame of the chest, making it larger both laterally and antero-posteriorly; the diaphragm pushes down the contents of the abdomen, and air rushes into the chest to fill the space thus produced, and supplies the oxygen needed for the purification of the blood. This is then returned to the heart to be distributed anew throughout the system, carrying with it the materials needed to supply the waste caused by the muscular movement originally made. These materials are often deposited in larger quantities than are required to counterbalance the destruction which has taken place, and then we have the muscle growing in size or in hardness, or both. The involuntary muscles also, including the heart and diaphragm, grow stronger in the same manner, the pulsations of the heart during exercise becoming more forcible, but at the same time slower and less obtrusive, showing that it does its work more easily; the increased activity of the circulation carries the blood in larger volume not only to the muscles but also to all the organs of the body, and thus stimulates them to greater activity, strengthening the appetite, the digestion, and the nutritive powers, and causing a gain in weight; the lungs themselves expand more fully and completely, and take in an increased quantity of air, this improved condition being known among professional athletes as the acquirement of "wind;" the larger amount of blood sent to the skin results in an increase in the quantity of perspiration, which carries with it much of the worn-out and useless or noxious material of the system, and thus adds to the resistive power of the economy against evil influences from without, such as bad air from ill-ventilated rooms or dirty streets; the bony framework of the chest, though elastic, does not go quite back to its original dimensions, but increasing, a little at a time, soon becomes noticeably augmented in size, giving additional room for the important organs which it contains and protects. In other words, as the most obvious but least useful effect of exer-

cise, we increase the size and power of the voluntary muscles; at the same time we add to the functional ability of the involuntary muscles, and are thus enabled to use this increased power with comfort and safety, while through the processes of respiration and circulation we influence not only the health and strength, but also the growth and development of the whole body.

These beneficial effects were long ago recognized empirically, by the ancients, who, without a trace of scientific knowledge, had learned by observation and experience the great value of muscular movement. Accordingly, we find in the competitive games of the Greeks and Romans a system of elaborate exercises which brought large numbers of persons to a degree of bodily strength and health which has never since been surpassed. But they neglected altogether the application of these laws to the preservation or to the improvement of the general health. They made the strong stronger and the swift swifter; but they did not apply these to the feeble, the infirm, the deformed, or to the still larger class—the lazy—who, most of all, need to feel their good effects.

The rule of health which prescribes exercise is, of all hygienic rules, the most easily transgressed. To violate it, it is only necessary to disregard it. A sin of omission is always easier than a sin of commission. Intemperance brings its direct and unpleasant results in headache and nervousness; gluttony in indigestion or biliousness; over-work in exhaustion or weakness; but the evils due to want of exercise, though no less grave, are insidious and elusive. Want of appetite, sleeplessness, languor, chilliness, general debility, many more serious ailments, are due directly to this cause, as every experienced physician knows, but are rarely referred to it. It is for this reason that the move in the direction of physical education in our colleges has a broad significance, and should engage the attention and interest of the public at large. Probably no more potent means of elevating the standard of public health can be conceived than the general adoption of some form of systematic exercise, provided it be properly adapted to the needs of the individual. It is not contended that exercise is beneficial when indiscriminately or carelessly employed. On the contrary, it may be as injurious as it should be helpful. For the tired, overworked or delicate person of sedentary occupation and indolent habits, or for the immature and untrained student suddenly to take up an active or violent form of gymnastics, or one of the recreative sports which makes the greatest possible demand on the heart, lungs, and muscles, is in the highest degree injudicious and reprehensible.

There is no royal road to strength and health, as there is none to knowledge. Each individual has special needs to be met, special dangers to avoid, and we may now occupy ourselves with the methods by which these needs can be determined and these dangers pointed out.

In supplying any system of examination, with a view of ascertaining the particular requirements involved in the proper care and development of the body by means of exercise, the object remains the same, whether the plan is applied to a single individual or to a large body, such as the students of a university. The aim is to establish in each case the present condition of the individual by a

series of measurements and tests of strength taken in conjunction with his personal and family history, showing at the same time not only his absolute but also his comparative strength, demonstrating his points of special weakness, and indicating, therefore, the direction in which he most needs development. Our recreative and competitive sports, while of the greatest interest and value, do not supply these desiderata for the students. On the contrary, he is too apt under their stimulus to aim at developing himself in precisely the direction in which he least needs it. Having a powerful back and loins, he goes into the boat crew, or being especially strong in the lower limbs, he takes up walking, running, or leaping. Such men, naturally athletic and fond of exercise, need to be guided and directed, sometimes to be restrained; others of sluggish temperament or of studious and scholarly habits must be encouraged and stimulated; but all require to have their work, whether spontaneous or compulsory, directed into proper channels, so that the result will be a harmonious and symmetrical development of the entire organism. —*Extract from Address of Dr. J. Wm. White, Director of Physical Education, University of Pennsylvania.*

Avoidance of Ether Sickness.—Making a patient keep his eyes closed while recovering from the inhalation of ether is a great aid in preventing sickness; for, owing to the patient feeling giddy any object at which he looks appears to sway from side to side; and this, by itself, is sometimes enough to produce a feeling akin to sea-sickness, even in those who have not been anesthetized.—*Med. and Surg. Reporter.*

HINTS AND QUERIES.

Given a case of loss of lower teeth, beginning at the right lateral and making a clear sweep around to the left, leaving not a remaining tooth, while from the right cuspid to the right third molar inclusive the teeth are in situ and are free from decay: how may artificial substitution be best made? There is but little ridge, the absorption being considerable, after supposed pyorrhea alveolaris, by which the teeth were probably lost.—F. S. Harris.

Lately I have been annoyed by little scars on the palatal portion of my vulcanite plates, and am at a loss to account for them. These scars are irregular in shape, size, and number, and do not seem to affect the fit of the plate, being but the slightest bit lower than the surrounding material; indeed, they may act as air-chambers, securing a readier adaptation. They give the surface of the plate a worm-eaten appearance, and it is worthy of note that they are almost invariably found towards the center of the plate. I am using the Bow-spring rubber, and pack with moist heat, steaming with just a little water in a covered vessel, and closing the flask gradually. I very seldom make an air-chamber. Now, what causes these phenomena, and how may they be prevented? Will some one kindly inform me?—F. S. Harris.

I have a patient, a girl eleven years of age, who is cutting nine teeth at one time, viz., two upper second molars, one lower ditto, four upper bicuspids, and the two upper cuspids. She says she lost, or had extracted, all the temporary

teeth at one time. She is a healthy, well-formed girl, but says she "don't enjoy the cutting process a bit." The gums are badly swollen, but, as the teeth do not seem to be in the least irregular, I think she will come out all right.

Has any one else seen the like?—C.

To the Editor of the Dental Cosmos:

Dear Sir: In the "Hints and Queries" of the August, 1884, number of the Dental Cosmos I replied to the inquiry of the corrrespondent "E. C. B." as to the best mode of cleansing and removing dark stains from teeth, and advised the use of sulphuric acid and pulverized pumice. I also suggested that this was the best of all remedies for the treatment of what is known as "Riggs's disease." Having received many letters asking to know more definitely my mode of application and the result of my experience, I have decided, with your permission for space, to state briefly my practice in the treatment of said disease, and all similar affections, for nearly thirty years, during which time I have never varied my treatment, because I have never seen the necessity for doing so. This, to some, may seem an extreme declaration, and an evidence of radical contractedness, especially when uttered in the face of the lengthy discussion on the subject of said disease reported in the September number of the Dental Cosmos, 1884, in which some of the ablest men in the dental profession took part, and none, save one, Dr. L. D. Shepard, of Boston, suggested the remedy of remedies—sulphuric acid.

I will state, at the outset, that I have never seen a case of "Riggs's disease," pyorrhea, or any disease of the gums of a kindred nature, in which the teeth did not hold the cause.

The disease is an abnormal state of the gums, the effect of a cause not definitely comprehended, but generally supposed to be caused by calcareous or other foreign substance deposited upon the teeth. This being the case, I have considered it of first importance to remove, with suitable instruments, every particle of calcareous or other adherent matter from the crowns, necks, and roots of the teeth affected,—an operation generally requiring from a half to two and a half hours, according to the extent of the disease and the "set" of the teeth. I use only three or four suitably-shaped, smooth-edged instruments,—smooth-edged, not to avoid lacerating or hurting the gums, but to avoid scarring and roughening the surface of the roots and necks of the teeth, which should be preserved as perfectly smooth as possible, for removing successfully every vestige of deposit, never sparing the gums. This is, apparently, a rough and torturous operation, but in reality it is not very painful. I then apply sulphuric acid and pulverized pumice, with a brush of medium texture of bristles and shaped to suit, generally shortened to an inch or an inch and a quarter in length, and from which every other row is cut out, leaving a space between the rows of one-eighth of an inch or more, so that the operation shall be effective upon every surface of tooth-structure.

The strength of the acid (pure sulphuric) is varied to suit the respective cases,—the greater the extent of the disease and the more unhealthy the gums, the stronger the solution,—varying from one of acid to ten, twenty, or thirty of water. I use the brush with considerable force (to an observer seemingly intent upon tearing the gums to pieces), fearless of consequences, nothing but good results ever occurring. I always inform my patients that the operation, to be effective, must be forcible and thorough, and that they may expect the gums to be uncomfortable for several days. They accept the explanation and submit, hopeful of good results. After use of the brush and thorough rinsing of the mouth, I inspect carefully to see that every particle of deposit has been removed, and usually make a

second examination in the course of two or three days, when, if there be remaining any points of deposit, they can be readily detected and removed. I advise the practice of moderate finger-pressure to the gums, half a dozen times or more daily, until they cease to suppurate, and to be continued daily, as also the use of the brush, to promote absorption and strengthen the gums. The mucous membrane often needs pressure for healthy results, but never needs friction. Consequently, the large majority of tooth-brushes on the market are objectionable and more detrimental than beneficial to the gums when used.

I think I can safely venture to assert, and without fear of successful contradiction, that forty-nine cases out of fifty, treated as above stated, have proved successful, when instructions have been strictly carried out and the patients have been entirely satisfied.

I pointedly advise patients to use the brush several times daily; also to use tooth-picks freely, and to discard all dentifrices as worthless and non-essential for the healthy preservation of dental tissues.

Scurvy, pyorrhea, or Riggs's disease, as any one may prefer to term it, like any other disease, is liable to recur more than once in a lifetime,—like causes producing like effects. It is not, or should not be, expected of dentists that they shall treat and cure diseases of the mouth and prevent recurrence any more than it is expected of practitioners of medicine to treat and cure malarial fever and promise no return. We must not attempt to overreach the mark. "Modesty is a virtue." It is not so important to know the cause of a disease as to know how to treat and restore to a normal state. Some things are past finding out quickly, and may remain mysteries to puzzle the comprehending powers of searchers after truth for generations and centuries. So it may be as to the definite and true cause of pyorrhea. It really matters but little, practically, as to what the cause may be, so that we learn how to treat and cure it. It is a disease of no favoritisms,—no respecter of persons. Both sexes, all ages (except the very young), all temperaments, all conditions, are liable to be troubled with it; but, fortunately, it can be cured, and easily. Physicians are expected to treat diseases and eradicate them from the system for the time being. Dentists are expected to do as much, and no more; and it would be presumptuous in them to assume greater powers. We may check the ravages of decay in teeth by filing, drilling, excavating, and filling, and using the brush freely, but we have not been able yet to get at the cause definitely. We know that decay will cause destruction of tooth-substance, and we can remove that cause and save the tooth. So with pyorrhea, or Riggs's disease. We can remove visible, comprehended causes, and check or obliterate for the time being the effect of the cause, but nothing more, and we must not presume to go further. Let us be content to grapple with disease successfully, let the cause be what it may, and we will render a service to suffering humanity commensurate with man's capacity and equal to man's ability to appreciate.

In conclusion, I would say to dentists: Have no fear of injury resulting from a judicious use of sulphuric acid; and will suggest to experiment freely and fearlessly with said acid, and decide as to the merits of the treatment above stated.—B. F. Arrington.

Dr. J. H. Martindale, of New York city, publishes, in the February number of the Dental Cosmos, "Hints and Queries," an interesting account of his experiment with the muriate of cocaïne.

I would venture the suggestion that the doctor's experiment came nearer being

a success than he at first imagined. No doubt an effect upon the lingual branch of the fifth nerve is even more desirable than one on the dental branch, as the former supplies the gums, and, to a certain extent, the periosteum of the teeth also. While I do not wish to be understood as saying that an arrest of function in the inferior dental nerve is not desirable, I do believe that such effect produced upon the lingual branch is more to be desired.

The conditions under which we extract teeth nowadays preclude the idea of much nervous connection with the dental branch; its chief connection, that with the pulp, having in almost all instances been destroyed by diseases of that organ. Consequently, the chief source of pain must be the irritation of the lingual branch. However, an injection a little higher up than the point suggested in the article will be more likely to affect both branches at the same time, as they are there in closer approximation.

I would like to ask Dr. Martindale if the puncture made by the needle of the hypodermic syringe in that region has been followed by any unpleasant symptoms in any of the cases mentioned?—W. F. Wegge, *Baltimore.*

The Walb Method of Using Hydrochlorate of Cocaïne.—Being associated with Dr. Walb, and having witnessed his method of using cocaïne in a large number of cases, I will briefly describe it, as it may prove to be of interest and value to the dental profession. (Darmstadt is, at present, the only place where hydrochlorate of cocaïne is manufactured. It is prepared by Mr. E. Merck, who, by the way, has the largest drug house in the world.) It is of interest that this potent drug should be so successfully applied in dentistry by an American in practice at Darmstadt.

Dr. J. Morgan Howe, in the Dental Cosmos for December, and others of the leading members of the profession, report as to the application of the solution to the cavity of the tooth that they fail to get decidedly favorable results. Dr. Walb's method is to inject a two per cent. solution of the hydrochlorate of cocaïne hypodermically over the root of the tooth to be operated upon. The full anesthetic effect of the drug is developed in from five to ten minutes, and remains ten to fifteen minutes. Dr. Walb uses it with great success in the extraction of teeth. He frequently extracts a large number at one sitting painlessly, having first made the necessary injections, *i. e.*, usually an injection on each side in the gum above the roots of the teeth, or as many injections as the condition of the patient and the number of teeth to be extracted may indicate. The ordinary hypodermic syringe is used. The doctor also removes live pulps from the teeth without the slightest pain, and without previous treatment. He has used cocaïne with great success in excavating sensitive cavities. In very sensitive dentine, and in removing live pulps that are beyond saving, the parts are obtunded in the manner described.

I have seen excellent results from its use. I was recently operating for a lad of fourteen, upon a lower second bicuspid that was decayed to the process upon its distal surface. The pulp was nearly exposed. It was impossible to prepare the cavity in a proper manner, because of its extreme sensitiveness and the irritability of the patient. After an injection of cocaïne I had not the slightest difficulty in thoroughly preparing the cavity and making suitable slots for the retention of the filling.

In a large number of cases the results, while not absolutely invariable, have been generally favorable. So far, no ill effects of the drug have been observed. —R. C. Mowbray, M.D., D.D.S., *Darmstadt, Germany.*

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ORIGINAL COMMUNICATIONS.

THE DEPRESSED MATRIX.

BY LOUIS JACK, D.D.S., PHILADELPHIA, PA.

WHILE the depressed matrix has required for its production but a moderate amount of inventive talent, it has proven a very useful adjunct to those who have grasped the ends involved in its use. That its employment has not become more general is probably due to the absence of precise information upon some essential points of the procedure. It is herein intended to supply these deficiencies and to describe the improvements which have been made from time to time.

The method of filling teeth with gold by the aid of depressed matrices is applicable to those of reasonably good structure and having well defined borders. The converse of this is that they are not applicable for the employment of gold in teeth much broken down by caries, or which have weak walls, or which are of very poor quality. The first efforts in the direction of similar aid consisted in the use of pieces of thin separating files and bent pieces of silver, which were not infrequently used.

The alterations to be referred to adapt this matrix more nearly to the methods of practice in proximate cases, which widening experience has forced upon the more painstaking as the most rational and the best calculated to restrain the recurrence of caries in these positions.

The method here alluded to, fortunately or unfortunately, as it may be viewed in the minds of practitioners, has been called the contour method. I am of those who regret the use of the word "contour" as misleading, if the definition given it by some of the advocates of the method is to be viewed as strictly governing the form of the filling to be produced. The original meaning of the word, as is involved in its construction, was "a rounded form," which, as the arts advanced, came to mean the outline of an object,

and was particularly applied to statuary and similar works of art. This is the sense in which it has been applied to operations upon the teeth. The forms of some teeth are such as to be restrictive of caries; they are well rounded and narrow at the cervix; touching each other at but a small amount of surface. These teeth are of typically excellent form, and when accompanied by good structure are capable of enduring the vicissitudes of health. They are also capable of being readily cleansed. Other general forms, the opposite of this, are flat at their proximate aspects and in close contact from the cervix to the coronal surface. Teeth of this class are typically much predisposed to caries, and usually greatly inclined to the recurrence of destructive action after being filled. In all restorative efforts the former type rather than the latter should be the ideal one, and the shape of the fillings in the latter named class of teeth should, as far as their nature will permit, be molded into conformity with the plan of the other class.

This is, however, not the place to enter into an extended discussion of the question of contouring or of its advantages or disadvantages; but these statements become necessary as a prelude to any description of the use of matrices to enable an intelligent idea to be formed of the objects of the method. It will be perceived that the prominent intention in the employment of the matrix is a restoration of the lost tooth-substance, by a plan which will produce points of comparatively small contact and in a manner which will give a free triangular space at the cervical aspect. When the plan was first practiced it was advocated as a means to fill principally the distal cavities, because of their extreme difficulty, and the impossibility of securing excellent results in positions where it was nearly impossible to make the proper application of force.* Since then a larger practice of the method has shown that the plan is equally or even more satisfactory for all proximate cavities of more than medium size in the bicuspids and molars. It also enables operators of medium skill to attain as good results as the operations of those of high skill, and would save the latter a great proportion of the nerve strain which is required to produce excellent results.

As several important changes have been made in the form of the matrix, of the instruments to be used, and of the details of the method, it will be necessary to give a new description of the whole procedure, which will be made as concise as the circumstances will permit; while at the same time, to attain on the part of the student a clear knowledge of the process, it will be necessary at some places to mention the minutest details.

* See DENTAL COSMOS, April, 1871; also, Appendix to Taft's "Operative Dental Surgery," fourth edition.

The Separation of the Teeth.—A necessary preliminary step in nearly all cases is the separation of the teeth, if the affected ones are in contact. The amount of separation depends upon the size of the cavity and the degree of convexity which may be considered necessary. In the large majority of instances only so much opening will be required as will permit the matrix to be easily inserted. Where the teeth are firmly fixed and the margins of the cavity hard, a greater division will be required than where the teeth are somewhat mobile and the margins may require considerable cutting. The necessity for this will appear in the sequel. The means for the purpose may vary according to the degree of firmness of the teeth and the facility of the operator. Usually, if there is no necessity for haste, a starting with a strip of the rubber-dam, followed by two or three thicknesses of cotton tape, will be sufficient. If it is necessary to be in haste, the required thickness of rubber may be used at once, and the teeth may be rested for a few days by a stopper of gutta-percha. It is, however, an advantage to have an abundance of room if it can be secured.

FIG. 1.

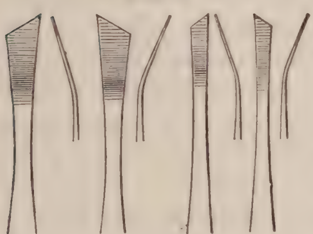


FIG. 2.

Separation by Cutting.—This is only proper where there is a very large cavity and it becomes necessary to cut away from the weak margins of the outer and inner walls. The proper instruments to separate in this manner, and to be used in preparing the proximate edge of the walls in all cases, are such enamel cutters as will properly reach the surfaces. The form of the space should be wider, if attainable, at the cervix than at the upper part of the tooth.* Even when teeth appear squarely formed this is not difficult of accomplishment, as a little cutting away near the neck and a little fulness given in the completion of the filling at its prominent point secures the necessary form to the interstice. The chisels for cutting near the cervix should be slightly bent, flat, and thin, having square edges. (See Fig. 1.) They should be tempered extremely hard, and are better made of chrome steel, as no other kind will continuously cut enamel without losing its edge too frequently. They should be used to plane the margin rather than to chip it away;

* It will be observed that in this article the teeth will be considered in reference to their longitudinal axes as separate from their relations to the body,—the upper part of any portion of the tooth being that nearest the coronal surface. This will prevent the confusion which arises in the description of upper and lower teeth in the same pages, and will avoid circumlocution of language.

the direction of the force in cutting being downwards and inwards.

Opening the Cavity.—Before the completion of the paring of the lateral walls, and sometimes as the first step, the overhanging coronal enamel should be completely cut away. This is best done in hard enamel by means of thin and rather broad gouge chisels, similar but thinner than that of Dr. Wetherbee, which is shown in the cut (see Fig. 2); or, if the enamel be here disorganized or of soft structure, this cutting may be done by sharp rose drills in the dental engine. Generally, however, the gouges are more expeditious and less disagreeable. The cutting should extend to the depth of the bottom wall of the cavity on the distal surfaces, and nearly as far on the mesial surfaces. This is an important step, and is an essential feature of the operation. It gives access to all parts of the cavity, and furnishes the conditions of form which in all cases facilitate satisfactory introduction of the filling material.

At this stage of the case it becomes necessary to consider what direction to give the cavity to facilitate the introduction of the gold. The general direction of the outer and inner walls, while sometimes determined by the form of the carious cavity, should be governed by the position from which the case is most conveniently approached during the filling process. While the instruments for this purpose are planned to adapt the gold to positions in somewhat lateral directions, it is, however, better for obvious reasons to avoid this whenever practicable. In filling the upper teeth of both sides and the inferior right ones, the general direction of the cavity should be inclined slightly outwards. Even if this brings the retaining groove out to the buccal margin, it is no disadvantage. It may be stated here that where this wall may be weak or where it may be of importance to build the gold more around the tooth at this part (which is frequently required), it is well to cut off a portion of the end of the outer wall of the cavity. This part is replaced by gold, and adds to the substantiability of the operation.

Forming the Cavity.—After the softer caries is removed and the edges of the cavity have been defined, such parts being cut away as are frail, it becomes necessary to give the cavity a retentive form. The shape of the cervical wall should be curved where this is admissible, and it is better that it should extend so high up that when the case is finished the cervical margin of the filling shall be covered by the gum. This lessens the chances of caries recurring, for two reasons: The cutting, at least at the middle of the interstice, has reached the cementum, which structure is less liable to caries than the enamel; and the covering by the gum of the line of union of the filling and tooth is in itself protective. The reason for the latter means of protection has not, so far as I know, been clearly

stated, but it may be said here that the obvious cause is that, if the gum be in healthy condition, foreign matters are mechanically ex-excluded by the close apposition of the gum, and deleterious fluid matters are eliminated by the constant epithelial action. The direction of this wall should be transverse to the longitudinal axis, and should be neither grooved nor have retaining pits.

The importance of properly scraping the face of the tooth outside of the cervical wall can scarcely be overrated, as often where the cavities are large some partial easily overlooked disintegration of this surface exists. It may be done with one of the smaller sickle-shaped scalers. Another very suitable instrument is here shown. (See Fig. 3.)

The means of retention are confined to the outer and inner walls. These should be grooved throughout their whole extent, from the curve at their junction with the cervical border to the outer limits of their junction with the coronal surface. The groove should be rounded at its bottom, to facilitate the gold completely filling it. It should be cut with small gouge-like instruments, which for the larger cavities should be of paraboloid form; in the smaller cavities bone-cutters of the shape of the annexed figure (see Fig. 4) are very applicable. The outer limits of these grooves included in the coronal plate of enamel are generally most easily cut by fissure burs, and in the smaller cavities whenever admissible the fissure-bur drill may be used to form the whole of the groove. The relation of these walls to each other should be, if attainable, nearly parallel, but so approaching each other towards their coronal outlet as to be somewhat retentive. In the natural procedure of the preparation this is easily secured, since the general form of cavities is narrower towards the upper or coronal aspect. It is in this narrower part that we have the liberty to make the cutting which gives the proper access to the cavity alluded to above; and here also the strength of carious teeth is usually so great as to furnish opportunity to make whatever cutting may be needed.

FIG. 3.

FIG. 4.

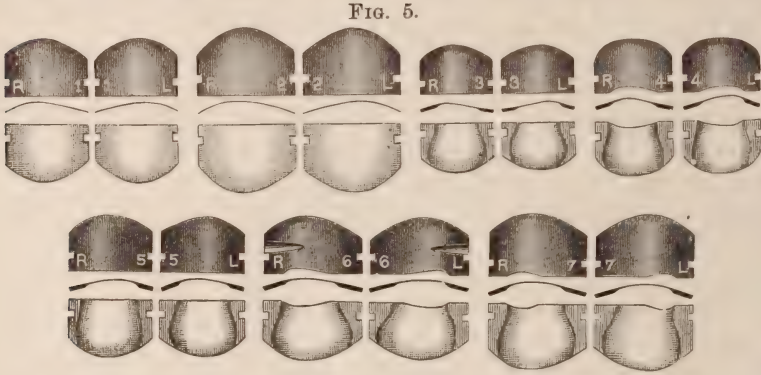
Countersinking.—This should in all cases be carefully done. Along the cervical wall, where, if possible, no enamel should remain, only the corner should be taken away; while along the course of the two retaining walls the beveling should extend inwards towards the retaining grooves, and yet should not be carried so far as to weaken these walls. It is important, however, that the gold in the finished

case may be extended as far outwards and inwards as possible. The countersinking of the coronal margins depends upon the strength of the walls; if they are weak, it should be greater than when they are strong, for the reason that then is needed the protection of a covering of gold.

Polishing the Cavity.—All parts of the cavity, the margins more particularly, should now be thoroughly polished with powdered pumice by means of orange-wood sticks. The obvious purpose of this is to facilitate the movement of the gold by lessening the friction, and it is also evident that the contact of the gold with the whole cavity may be more certainly secured under this condition than if left unpolished.

The cavity, as now presented, if viewed from a direction opposite to its bottom, would show it with but three sides. We come now to declare another purpose of the matrix, which is to supply, as it were, a fourth wall, and transfer the natural bottom of the cavity

Fig. 5.



to the cervical wall. This transforms an otherwise difficult case into a comparatively simple one, and gives it the elements of a coronal cavity.

The accompanying illustrations (Fig. 5) represent the forms of the appliances alluded to, which at first sight do not present much difference in appearance from the engravings of the first ones.* There are, however, essential differences, consisting principally in the thickness, which is reduced so greatly at the cervical part as to permit some adaptation by springing; they are curved from end to end, thus enabling a greater degree of convexity of the filling to be secured; the width of the throat is increased to permit freer access, as well as to conform to the improved shape of the cavity, consisting in a larger coronal opening in the lateral direc-

*See Dental Cosmos, vol. xiii., page 170.

tion; and all the roughnesses of the plain surfaces are removed to enable a better fixation to be made.

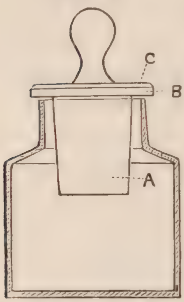
The first set of matrices devised were many of them quite thick and too much wedge-shaped. These are capable of being re-formed to the shapes of the second set, which are less wedge-shaped and thinner. This latter set remains useful for cases where there is abundant space and where they are in other respects adapted, but for the usual cases the improved set now offered is much better adapted than either.

The two teeth involved and the one anterior to them should be invested by rubber-dam and properly ligatured. A matrix should be selected the dimensions of which are such that the depression will extend slightly beyond the lateral boundaries of the cavity. It is applied in place, and is correct if, when the coronal edge coincides with that surface, the cervical edge has passed slightly beyond the cervical wall; if it will not do this, another is tried, until the proper selection is made, when it is secured in place. The fixation of the appliance is of the greatest importance, and as, from want of this information, many have failed to be successful by this method, I shall give the most explicit directions.

It will be observed that the form of the space is wider at the lower part, near the gum, and also that the matrix is thinner here than at the other edge; and as, from what has been previously stated, it is desirable that this relation be maintained, it is obvious that the matrix at this part must be firmly wedged against the tooth to be filled. This is done by cutting a double wedge,—that is, it is thick at one edge and runs to a feather at the other edge, and it is thicker at one end than at the other. Hence, when this form of wedge is pushed into place, it firmly binds in the cervical edge of the matrix against the tooth. The width of the wedge depends upon circumstances not easily indicated here, but generally in moderate cases is two-thirds the width of the end of the matrix. This wedge is pushed in from the buccal side. As it is tapering in the other direction, it will be perceived that it will not cover much of the inner end of the matrix; it is necessary, therefore, to insert another wedge here, which is pushed upward in a transverse direction to the first wedge. It will be noticed that the space between the teeth has been made greatest at the lingual aspect, as stated above, and this space will indicate the form of wedge to be used. It will often be found that the end of the piece of orange-wood from which the first wedge has been excised will be nearly correct for the second wedge. This second wedge is pushed laterally into place. In excising the first one, it is important to be careful not to cut the dam with the points of the cutting forceps.

Before pushing each wedge into place it should be dipped into sandarac varnish, of the consistence of syrup, the excess being previously removed; this fixes the wedge and the matrix so firmly that there is no danger of displacement. After drying the rubber carefully in the neighborhood of the ligatures, a portion of the varnish is applied to the dam at points somewhat remote from the cavity. When it loses the alcohol by evaporation the dam is fixed well enough for cases where there is not so much strain upon it as to require a clamp. For this aid of the use of sandarac varnish we are indebted to Dr. Pugh, of Philadelphia, who also often employs this varnish very efficiently to secure rubber-dam in place to avoid the necessity of using the clamp. To keep the sandarac in proper condition for use, and to enable access to the bottle at all times without the annoyance of adhering stoppers, Dr. Pugh has had in use a valve of leather loaded with lead depending in the mouth of a low, wide-mouthed bottle, of which Fig. 6 is a representation. A little alcohol added from time to time keeps the varnish of correct consistence. When there are spaces between the contiguous teeth, these should be secured by wedges pressed into the interstices. This better secures the fixation and prevents the lateral strain of the packing from disturbing the position of the teeth being operated upon. The most suitable substance for these wedges is orange-wood. It has the requisite firmness and grain, and comes in the most convenient form, being in bundles under the designation of "peg-wood" among watchmakers' supplies.

FIG. 6.



A, lead; B, leather; C, metal plate.

Preparation of the Gold.—The gold to be used for the first two-thirds or more of the filling should be absolutely non-cohesive. It should have the property of not being rendered cohesive by the annealing process, and only with this kind of foil can the best results be obtained. It then has, as far as gold can have, the yielding and plastic qualities of tin-foil. While I am aware that the expression that pure gold may be made which does not become cohesive by heat may be questioned, it is nevertheless true that some of the very purest and finest gold manufactured has this desirable property. So nearly universal is it otherwise, however, that I may be pardoned in departing from my natural disposition by mentioning two lines of manufacture possessing it, viz., the "Non-cohesive Globe gold" and Abbey & Sons' "soft" gold, the former being more uniform and more plastic. These are not always of even grade in this respect, and each order should therefore be tested. There should be

combined with this property considerable tenacity, or more properly tensile strength. Where this latter is deficient it will sometimes be found that it can be restored by warming slightly on a mica or platinum plate. It should be soft and yielding, tough, and kid-like to the feel, and when shaken in the sheet its vibrations should give out a soft sound, which to a quick ear will relatively determine the degree of the property. As this is an important matter, it should be stated that frequent advantage can be taken in operating to improve the working of absolutely non-cohesive gold by slightly heating it. It appears to become more like tin, and assumes the solid form without requiring any additional force. This property of gold foil has never been fully expressed nor satisfactorily explained. The dealers profess to supply non-cohesive gold, but very few are capable of meeting the requirements herein indicated.

The Form of the Gold Pieces.—The foil for the lower two-thirds of the case should be composed of blocks of No. 4, graded in size by the dimensions of the cavity. These blocks are made by folding the whole, half, or third of a sheet, as the case may be, three times, which produces a tape of eight thicknesses of foil. A greater number of thicknesses causes too great stiffness of the pieces. The tapes are then folded in the other direction of square form, and for some parts of the work into narrow blocks. It will also frequently be found advantageous to fold one of the square blocks upon itself to meet some exigency of the cavity. In making up the blocks from the tape various thicknesses may be needed, depending again upon the size of the cavity. When it is very large the half of a tape may be included in one block, and for smaller cavities each tape may be divided into several pieces.

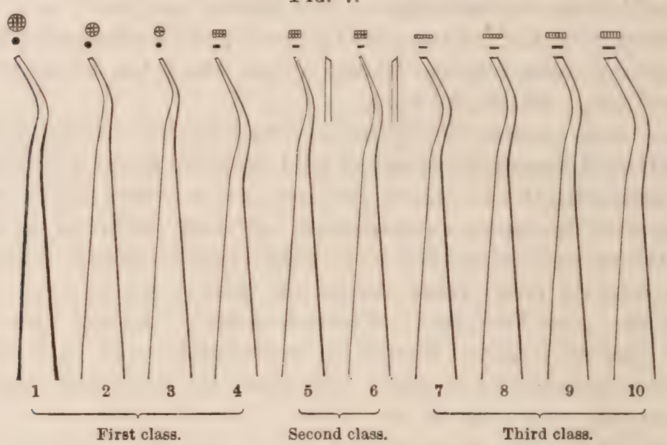
The gold for the upper or latter third of the cavity should possess the property of cohesiveness to the fullest degree, and yet should be of that soft nature that it will yield under the plugging instruments without balling, and be tractable to the force of the burnishers. Any other cohesive gold than this is worthless for filling teeth except where it is intended that the surface of the filling is to be directly bitten upon. The form of the gold for this purpose may be made by folding a whole sheet of the No. 4 into a tape of eight thicknesses and cutting it into strips by cross section, or No. 20 may be employed. For the majority of cases I use the latter form of cohesive gold, cutting the sheet into ribbons and then into sections of various widths. One or two thicknesses of this may be used with the greatest facility.

The plugging instruments herewith figured (see Fig. 7) are composed of three classes: First, Nos. 1 to 4 are for the general introduction of the blocks. Second, Nos. 5 and 6 are for the condensation of the

first blocks upon the cervical wall. Third, Nos. 7 to 10 are for the condensation of the gold at all parts of the cavity after the first pieces are established. This latter form of instrument when inserted in the automatic mallet or the Bonwill mechanical mallet is capable of producing better execution and more continuous work than any other instrument with which I am familiar. It was planned to meet the exigencies of matrix filling, and is moreover well adapted to all cases which have been properly opened to furnish easy access.

Packing the Gold.—The cavity which presents itself for filling after the matrix is in place, as previously described, is not unlike a large crown cavity, of which one wall is removable at the conclusion. There is but little greater difficulty in filling perfectly this cavity than in filling a cavity on the grinding surfaces. There are, however, certain precautions to be taken to secure perfect adaptation at parts which are essential to success. It is necessary that the gold at the cervical margin, and along the line where the inner and outer plate join the matrix, shall be put in perfect adaptation to the margins of the cavity at the moment of insertion. The plugging instruments have been planned to facilitate this, and the directions now to be given are to indicate how this object may best be secured.

Fig. 7.



The first block of gold should be of sufficient dimension to extend from side to side of the cervical floor, and should be large enough in the other direction to be subject to crowding between the wall towards the pulp and the matrix. This piece should first be inserted and partially condensed, when at each side of the cavity a small block should be carried down by the pliers, one side being directed into the line of junction of the margin and the matrix. The other side of the block is then carried by one of the first class of pluggers

into the retaining groove, and by hand-force or by the mallet driven into the lower part of the groove with sufficient power to fix it firmly in place. After these pieces are established they should be carefully and thoroughly condensed at all points, particular attention being directed to the extreme margins. The precarious parts of fillings on proximate surfaces, when executed by the ordinary methods, are about the cervical wall and where this wall joins the outer and inner ones. This springs from a variety of causes. The tendency of all forms of gold is to draw away from the edge unless the force is applied over and somewhat beyond the margin. The fear of abrading the margin and of displacing the gold often prevents that diligent and continued labor upon this point which is generally requisite. But when the matrix is employed this danger is removed, the margin being protected by the continuous layer of gold which has been established, and without danger of marring the border or of displacing the gold the most perfect adaptation may be secured. To effect the condensation here, either the second or third class of pluggers may be used.

The same process should be continued for the placing and condensation of successive layers of gold until the lower two-thirds is complete, with the exception that less care is needed for the middle block, but the same carefulness is obviously required to secure adaptation to the walls. The gold should advance down the walls slightly faster than the middle part is packed, which will cause the gold floor as it advances to be of concave form. The third class of pluggers should be continuously used in a diagonal direction across the cavity; the bend of the blade impinging against the one side of the throat, while the point is engaging the gold along the other wall of the filling. It is also preferable to have the gold in contact with the face of the matrix advance somewhat faster than the gold near the opposite wall, to facilitate solidity of this face.

When the gold has approached near the line of the inner border of the coronal enamel the use of non-cohesive foil should cease. Without consolidating the last layer, cohesive foil should be cut into it with single-line wedge-shaped plugger points, and as soon as incorporation is effected over the surface, condensation may be carried out, when with the same gold the remainder of the filling is completed.

It will be observed that the filling is divided into two distinct parts, the latter portion being essentially a separate filling, and would be perfectly retained if the previous part were burnished. The cohesive gold is incorporated with the surface of the non-cohesive for the convenience of starting the former.

Removal of the Matrix.—The wedges are withdrawn by means of the sharp teeth of the pliers, and for their easy removal the precaution should be taken in their placement of leaving sufficient end for grasping the one placed at the cervix. The inner one is simply pushed towards the centre of the mouth. In case the matrix

Fig. 8.

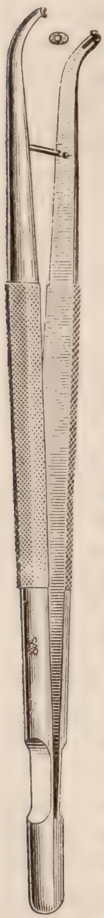
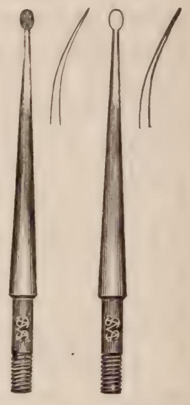


Fig. 9.

Fig. 10.



remains firm, it is withdrawn by the pliers (see Fig. 8), which engage in the slots. The filling will be found on the removal of the appliances to be in contact with the surface of the proximate tooth, the force having sprung the matrix out somewhat, and frequently the teeth have yielded enough to overcome the space made by the wedging. The form will also coincide with the concave face of the matrix, and a decidedly wedge-shaped interstice should exist at the cervix. If the packing has been properly done, the gold will be found to be dense and homogeneous and to require but little labor to effect the finishing.

In cases where it is found advisable to carry the gold much around the buccal margin of upper molars near the parts where they shall be in contact, the matrix may be removed after the layers of cohesive gold have well advanced. This portion may be built out and over the cusp as far and as much as may have been determined upon. In this case this margin and cusp should have previously received the modification of form required for this purpose.

The Finishing.—It is obvious that the plan of operation involved in this method requires but little alteration of the form presented by the filling in the state above described. The first step is a thorough burnishing at all accessible parts. The form of burnisher most useful is one of the oldest shapes in existence, and is somewhat like the

files herein shown in Fig. 9. By means of these files the margins should be trimmed to roundness and smoothness; after which the cervical border should be trimmed with pointed cutters and files similar to Fig. 10 (which shows Dr. Rhein's cervical files for trimming gold), and dressed with narrow tapes of emery cloth. These latter can often be inserted in the cervical interstice, but should on no account be employed near the part of the gold intended to come in contact. It is obvious that this portion of the filling should not be reduced, as it will receive sufficient attention in the final finishing. After a reasonable degree of evenness is produced the finish can be completed by tape and pumice. In case there be not room to properly finish the case without marring the point of intended contact, the teeth should be separated sufficiently to accomplish this, and the finishing be done at a subsequent sitting. When the filling is completed the teeth should be well apart at the cervix and in contact at near the grinding surface at a comparatively small part; the lines of the filling from outward to inward should be well curved, and from the point of contact to the cervix should be nearly straight; the cervical margin should coincide with the tooth, whatever its form may be; and the coronal surface should be shaped to prevent dangerous occlusion, and should so join to the other surfaces as to make unbroken curves.

While the foregoing description is applicable to the use of gold, there is a wide further use for this appliance to aid the introduction and formation of plastic fillings, which, while they are all of a temporary nature, are in a multitude of cases and under various circumstances the only suitable substances with which many teeth can be filled with any promise of even short retention.

For Combination of Gutta-percha and Phosphate of Zinc.—The preparation of the cavity is somewhat as described, not so large a throat being necessary. The fixation is the same as stated. The adaptation of the gutta-percha to the cervix may be made in such a manner that no further trimming than dressing by means of tape and pumice will be needed. The condensation of the gutta-percha may be continued with some force until it has become cold. This treatment, under such conditions, adds greatly to its durability. When phosphate of zinc is inserted but little attention is required to complete the case, care being taken to prevent the too great adhesion of the zinc to the matrix by moistening the depression with oil or paraffin, first removing the excess. In case the teeth are so nearly in contact that there is scarcely room for the insertion of a thin wedge at the coronal part, it will be necessary to use the thin matrices Nos. 1 and 2. These are curved in two directions by a simple slight curve from cervical to coronal edge, and by an ovoid

curve from end to end; the smaller curve to be applied toward the buccal wall. This matrix can be removed endwise by withdrawing on the line of the curve. This is frequently necessary to prevent displacement of the coronal margin of the as yet imperfectly combined elements of the filling.

Amalgam Fillings.—The advantage of the matrix for the insertion of amalgam consists in two considerations. It permits the insertion of the material in a more nearly dry condition, and it gives the form the filling should have. It is, however, a thorough method for the purpose, and is hardly in agreement with the dangerous growth of the use of a material which for anything but the frailest teeth is a vicious system of practice. The procedure of the preparation of the cavity and fixation of the matrix are the same as when gold is used, the selection of the class of matrix depending upon the amount of space. The packing at first should be of small pieces of sufficient size to hold their place, being more rapidly inserted as advancement is made. The filling instrument should be warmed from time to time, and at the conclusion no free mercury should appear; if it does the amalgam has not been mixed in proper proportions. The removal of the matrix must be made with care to prevent marring the coronal surface. It will often, for this reason, be necessary to use Nos. 1 and 2, and withdraw endwise.

Combined Tin and Amalgam Fillings.—As tin fillings are amenable to friction, those entirely composed of this material are not durable; the latter third, or even more, should therefore be made of amalgam. Tin can be packed by the procedure described in this paper in the most satisfactory manner. The plan of packing the tin is identical with that for the non-cohesive gold, the completion of the last third being with amalgam. It is well known that tin-foil in large cavities not easy of access is difficult of management. Combined in the manner indicated with a dry amalgam, it produces better results than entire amalgam fillings. It has proven, except for its softness and difficulty of management, one of the best materials which have been employed for filling teeth, and when they are soft it is of greater service than gold, since it can be brought into adaptation with margins by less force.

The foregoing procedure being a precise method for filling proximate cavities, possesses many advantages to both patient and operator, and for these reasons is again presented for consideration.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a regular monthly meeting at the house of Dr. W. E. Hoag, No. 13 East Forty-third street, January 20, 1885.

The president, Dr. William Jarvie, in the chair.

President Jarvie. Gentlemen, as you all know, the experiments that have been and are in the course of being made with cocaïne are attracting a great deal of attention. Dr. Raymond has been studying this matter recently, and he will give us his experience.

Hydrochlorate of Cocaïne as a Local Anesthetic in Dental Surgery.

Dr. E. H. Raymond. Allow me to premise by saying that at the present time it is supposed that the members of the dental profession are familiar with this agent in its application to minor operations in ophthalmic, nasal, and laryngeal surgery; besides, it is being used in other parts of the human organism as a local anesthetic with great success. I will not pause to praise its excellences or its victories.

Dentally considered, there has not been that general satisfaction that has followed its use in the specialties above enumerated. There have been varying degrees of success and failure reported; and a singular consideration is this: With a solution of the same salt, where two men have used it out of the same bottle, one will go into the highest state of exultation over his successes, while in equally careful hands, perhaps, his fellow practitioner will meet with utter failure, and consequently loss of faith in his supposed newly-found acquisition follows. He abandons it. You can best judge of the reasons for this apparent discrepancy under like environments. Having tried to be faithful in using the agent by instillation (dropping it upon the tissues, or saturating them with it), I shall have to report failure, with but a single exception. The modus operandi resorted to has been as follows, when applied to sensitive teeth: The cavities of decay have been carefully dried,—being protected by the rubber-dam,—and a solution of the salt varying in strength from a four to a ten per cent. solution has been put in the cavity. After a lapse of from three to six minutes this was repeated. In some instances I have called into requisition the hot-air syringe. In only one case has there been any appreciable loss of sensation, except where the heat from the syringe was continued, and the dentine so thoroughly dried as to check the circulation through the

tubuli. This latter process, while it may induce loss of sensation from the excavator, produces a steady, intense pain, which no one should be asked to tolerate. It is *pain* that we wish to prevent!

I have tried no less than thirty cases, by instillation, in the mouths of as many persons, without any apparent diminution of pain. The hard character of the dentine seems to prevent the absorption of a sufficient amount of the agent to produce anesthesia. It seems, therefore, to follow that, instead of going from periphery to center, you can only get local anesthesia of the teeth with the drug by going from center to periphery. This can only be accomplished by hypodermic injection. By bringing the agent in contact with the nerve trunk, you will get partial if not total insensibility throughout its ramifications.

This brings me to the citation of cases of successful practical experimentation, which demonstrates this fact. Early in December, while attending Dr. John M. Woodbury, of this city, professionally, the subject of cocaïne was mentioned. He informed me that he and several of his friends had used it in minor surgical operations by injecting it on the nerve supplying sensation to the part to be operated on. As he had a very sensitive cavity to be filled in a molar, I suggested the idea of his being injected with the cocaïne, so that we might test the drug and its effects upon the tooth. He willingly assented. We accordingly went to the office of his friend, Dr. Halsted, who injected the drug with the following result:

Case I. Dr. W.; cavity on the posterior surface of the right inferior first molar; excessive sensibility on touching it. Caries had not caused much loss of the dentine covering the pulp. That organ was well protected and in a normal condition. The syringe was charged with thirteen minims of a four per cent. solution of cocaïne, and the needle-point directed on a line extending about midway between the angle and the coronoid process of the inferior maxillary, passing through the internal pterygoid muscle. The finger being placed upon the internal oblique line as a guide, the syringe-needle was carried along the inner surface of the ramus until it reached the nerve as it enters the inferior dental foramen. A "tingling" sensation was produced in the bicuspids and incisors when the syringe was discharged. In three minutes the tongue began to feel thick and numb on the right side. In seven minutes there was almost complete anesthesia of the right half of the tongue and the gums around the inferior teeth. The excavator being applied to the cavity which was previously so tender, no sensation whatever was felt by the patient. I then used the engine with perfect freedom, and prepared the cavity for filling, without any discomfort to him. Although there was just a slight degree of sensi-

bility in the bottom of the cavity, he said it amounted to nothing comparatively; he was just conscious that the instrument was there. The gustatory nerve, which lies near the inferior dental at the point injected, accounts for the tongue being anesthetized. As the gustatory was not touched, this shows that it is not necessary for the needle to penetrate the nerve-substance. The cervical portion of the cuspid on the left side was very painful to touch, owing to denudation of the soft tissues that covered it; but, while operating on the side injected, the cuspid, although being in the same condition as the other, could be rubbed with a steel instrument without the slightest manifestation of pain. The anesthesia lasted for about twenty-eight minutes, when normal sensibility returned. That evening at dinner there was some stiffness and a slight soreness in the muscles while masticating on the right side. The next morning there were no symptoms indicating that he had submitted to any unusual treatment.

Case II. Miss C., aged seventeen. The left superior central was decayed on the anterior approximal surface. There was excessive sensibility to the touch. The syringe was charged with ten minims of a four per cent. solution of cocaïne, and the point of the needle carried under the upper lip on a line nearly parallel with and a little to the right of the cuspid eminence, keeping it near the body of the bone until the superior maxillary nerve was touched where it emerges from the infra-orbital foramen. As the point of the needle came in contact with the nerve a pricking sensation was experienced in the lip and front teeth on the left side. The drug being carefully injected and the needle withdrawn, I waited for results. At the end of two minutes she exclaimed, "Oh! what a funny feeling in my nose!" In three minutes I pinched the left nostril with small pliers and pricked it on the inside with a sharp point, and it was as lifeless as a piece of leather. The lip was also without sensation. Touching the cavity in the bottom of the central, it was quite painful. In five minutes I put the excavator into the cavity again, and there was some sensation, but it was scarcely perceptible. This remained so until the excavating had been finished,—the anesthesia in the tooth not being complete at any time. Cold water thrown into the cavity was slightly felt. She said the pain in the tooth amounted to nothing, and that she would like to have the operation with the cocaïne repeated in the treatment of another tooth. In twenty-seven minutes sensation began to return to the parts, and in thirty-five minutes normal sensibility seemed completely restored. There was slight soreness in the cheek the next morning, but it was only noticeable when touched.

Case III. Mr. D., aged twenty-seven; cavity in the grinding-

surface of the right superior third molar. Injected with thirteen minims of a four per cent. solution on the nerve where it emerges from the infra-orbital foramen, as described in Case II. All the symptoms were experienced as in that case, the parts receiving filaments from the divisions of the superior maxillary nerve being similarly affected, while the cavity in the molar remained as sensitive as before injecting the cocaïne. It was obvious that the posterior dental nerve had not been affected.

Case IV. Mrs. R., exceedingly nervous temperament; cervical cavity in the left first inferior bicuspid. There being a gutta-percha filling in the buccal surface of the second molar, and remembering that it was one of the most sensitive cavities I ever filled (it was filled a year ago), in order to make a thorough test of the efficacy of the drug this filling was removed and the cavity found to be as sensitive as ever. I made a ten per cent. solution, using ten minims of boiled water to one grain of the alkaloid, and charged the syringe with five minims of the solution. This made just half a grain of the hydrochlorate, and the strength being greater, it reduced the amount to be absorbed. The point of the syringe-needle was carried to the inferior dental foramen, as before described. During this part of the operation at no time did the patient complain of being hurt, saying that it was *only* disagreeable. At the end of three minutes she facetiously remarked, "I am afraid I have lost the use of my tongue." In ten minutes I had a sharp bur removing carious dentine from the bicuspid, and also deepened the undercuts and applied it freely to the molar. There was no pain further than the consciousness of the instrument's presence. Cold water being thrown into the cavities, no pain was produced. At the end of thirty-eight minutes, when "stopping" the cavities, the molar was very sensitive and the bicuspid disagreeably so. They were left open to test the matter of the return of normal sensation, the patient kindly consenting.

Case V. Miss F. I found a large cavity in the first superior right molar. The pulp was slightly exposed and congested. The tooth had "ached" for a week. Opening carefully into the pulp cavity, and getting rid of the effused blood, I made an application of an eight per cent. solution to the freely exposed pulp. After five minutes it was touched and found to be sensitive. Another application was made. After waiting three minutes more I was enabled to remove a little of the "body." With the hypodermic I injected two minims into the palatine root,—carrying the needle along the side of the root canal for about one-third its length. At the end of twenty minutes from the time of the first application, the pulp was entirely removed with only a slight degree of pain, and the roots

and cavity filled temporarily. The patient said the pain "was very slight indeed." She seemed delighted at being relieved from the "ache" so easily and rapidly.

Case VI. Mr. B. The gentleman presented himself with pain in his face; found second left inferior molar dead, with fistulous opening on the gum opposite the posterior root. Pulp cavity and roots had been filled. The sinus was quite small, and very sore when touched with an instrument inside. Desiring to open freely, so as to facilitate the treatment of the tooth at the point where the trouble originated, I used a small pointed syringe and injected five minims of a four per cent. solution of cocaïne, passing it with great care into the sinus for about two-thirds its length. In five minutes I was enabled to make a free opening without a particle of pain to the patient.

Before removing the salivary calculus from the teeth, by taking a small piece of absorbent cotton, saturating it with the cocaïne and passing it around the necks of the teeth, it will be found that the disagreeable, although not very painful, sensation produced by the point of the instrument will be greatly relieved. Wait three or four minutes after its application before operating. Either a four or an eight per cent. solution will answer for this purpose, although I am using the ten per cent. for all purposes, believing it to be more efficacious. Several experiments have been made by injecting the cocaïne on the nerve as it emerges from the mental foramen, the result being that the teeth from the second bicuspid to the median line were rendered insensible.

The cases reported are only a few of those operated on, but are sufficient to demonstrate the method of using the drug and its effects.

The only way to get good results with the cocaïne is to obtain a quantity of the soluble alkaloid and mix it at the time of using it. The requisites are a minim glass, a pair of small scales, some filtering paper, and a little water that has been boiled. It is necessary to have an easy working syringe, with a perfectly smooth, sharp needle. Care must be taken to exhaust the air from the syringe when charged ready for use. This can be done by drawing in more of the solution than is needed and pressing it out to the required number of minims. Hold the needle point *up*, so as to allow the air to get above the solution; then press the piston. (I might say, parenthetically, as a pre-requisite to the above, that one should understand thoroughly the anatomical relations of the parts where the syringe is to be used.)

As during the course of the sensory nerves through the body they are accompanied by arteries and veins, it may be asked if there is

not danger in puncturing these vessels with the point of the needle in injecting? Owing to the elasticity and toughness of the arterial coats and the small size of these vessels in the region where the practitioner would use the syringe,—they being very little, if any, larger than the syringe-needle,—there seems to be no danger of puncturing them. They would doubtless move one side should the point touch them. As to the veins, it would matter very little if the points should go through their coats. The preponderance of white fibrous tissue in their composition, although rendering them less elastic than the arteries, gives them great resisting power and sufficient resilience to render harmless so small an invader as the needle-point. If they were penetrated, the effusion of blood would be slight and harmless. From injecting a large number of cases no ill effects have developed in the needle-tracks.

That this method of using the agent will become generally adopted by the dental profession cannot now be foretold or foreseen. There seems to be no reason why it should not be in cases of excessive sensibility of the teeth. Compared to all known methods for producing temporary and local anesthesia, this agent surely promises to take first rank. Its potency, its simplicity, and the marvelous localization in its range of action upon the nerve-trunks and tissues, coupled with its apparent safety, should make it the boon of boons to those requiring an anesthetic for the amelioration of physical pain.

That we should understand just *why* it produces certain effects is not indispensably requisite. What do we *know* of the mysteries of animal and vegetable life? What do we *know* of the mysterious, subtle electric agent, or so-called nerve-force? What do we *know* of the action of certain remedial agents upon certain organs in the body?

That we have an agent in cocaïne that we can utilize in this eminently useful and practical way is a matter of sincere congratulation to us as dentists, inasmuch as we can mitigate the severity of operations from which every sensitive patient shrinks.

Since making the above experiments, and tabulating the cases, I have read an article in the January number of the *Independent Practitioner*, by Dr. N. J. Hepburn, ophthalmic surgeon, etc., who reports to have been experimenting in the same line, but without carrying his investigations to a practical conclusion.

While I am rejoiced to see this, it is the first intimation I have had, either written or oral, of any special observations being made with the cocaïne by injection for operations upon the teeth.

In the cause of humanity, and for the sake of my profession, I trust that ere long it will be practiced extensively. Light and

truth should accompany innovation, and this should elevate mankind in his mental and moral status. The more investigators, the more light. The more light, the nearer we come to being benefactors of our fellow men.

President Jarvie. We had expected Dr. Woodbury, whose name has been connected with these experiments with cocaïne, to be with us this evening, but he has not yet arrived. There are other gentlemen in the room who have had some personal experience with this agent. Perhaps Dr. Perry will have a few words to say on the subject.

Dr. S. G. Perry. In order to study the effects of cocaïne, I allowed Dr. Woodbury, at Dr. Raymond's house, on Friday night of last week, to inject two minims in the left side of my lower jaw, the point of the syringe being carried nearly to the opening of the mental foramen. There was within two or three minutes complete loss of sensibility to the lower lip. That condition remained for some little time; it may have been an hour, and it may not have been more than half an hour. The particular point in this case to be considered is this: The next morning there was on that side of the face an uncomfortable sensation, which increased a little later in the day; not that it was pain; I could hardly dignify it by calling it pain, but it was an uncomfortable sensation, such as to keep me putting my hand to that side of my face and rubbing it; manifesting itself more particularly over the distribution of nerves which emerge from the mental foramen. Later in the afternoon it annoyed me quite a little; there were sudden jumps and starts, and a prickly sensation. The impression made upon the mind was as if some invisible little fellow had come from behind and got hold of my face and was pulling it a little, causing a drawn, stiff, uncomfortable sensation, accompained by a slight numbness of that side of the face. On Sunday morning and forenoon the uncomfortable feeling had very much lessened, but yesterday morning there came again the same uncomfortable sensation. I found myself rubbing my face occasionally, and there was the same prickly sensation dancing about and changing location. That continued during the day, and was worse in the afternoon, when I was tired from a hard day's work. This morning there was the same feeling, but not so pronounced as yesterday evening, and this afternoon, after an exceedingly tiresome day's work, the sensation was again quite pronounced. This evening the feeling is one of extreme warmth, but there is no prickly sensation. These unusual conditions having continued for four days, I must confess to a feeling of apprehension. It may be, however, that the point of the needle disturbed the nerve

to such a degree that all this train of after consequences may be due to that mechanical disturbance, and are not really the effect of the remedy. That is the reason I speak with hesitation about the matter; and the more so because Dr. Bogue submitted at the same time to a similar injection of cocaïne, and in his case, although he had a feeling of slight soreness the next day, he has not experienced the disagreeable sensation that I have had to-day and yesterday. These are the facts of the case, and very carefully stated, because it would, of course, through nervous apprehension, be easy for me to exaggerate the affair. From my experience I cannot help but feel that perhaps the insertion of the needle in the main trunk of an important nerve may be a dangerous thing.

President Jarvie. We have with us to-night one of our members who has been absent for some little time, and we should be glad to hear from him on this subject if he has anything to say. Dr. Bogue, shall we hear from you?

Dr. Bogue. I do not know that I have much to say upon the subject, except possibly to confirm the first part of Dr. Perry's remarks in reference to the sensation produced by the remedy when injected in my own mouth. The sensation had entirely passed away by Sunday. The numbness produced was limited to, I should say, an inch, or an inch and a quarter at the outside, in distance from the superior margin of the lip. One remark in Dr. Raymond's paper I would like to allude to. In reference to his use of hot air and the pain produced by it, I question very much whether he has been able to get an instrument that would give a continuous current of hot air for any length of time. And if at first the current was decidedly hot, and in a few moments became decidedly cold, you can all see that the pain would be considerable. With Dr. Brasseur's instrument, which I have used for nearly three years, a hot current is maintained, and I have heard the sensation produced by it described as feeling like a warm poultice put upon a sore spot; that is, quite comfortable. In almost all instances the patients say there is a marked alleviation of pain; in some others they say they don't know, but, upon the removal of the hot air current and the substitution of cold air, I generally get the impression that the patient would rather have the hot air current than not. Previous to introducing the current of hot air into a sensitive tooth I think it is well to saturate the cavity with carbolic acid. The hot air can then be thrown in with the effect, in almost all cases, of very much reducing the sensibility of the part.

Dr. Raymond. I would like to say that latterly I have been using a little pellet of cotton saturated with cocaïne for touching the mucous surface before inserting the needle. Dr. Perry has referred to

a possible effect upon the nerve produced by moving the instrument around after its insertion more than was really necessary to touch the nerve. In reference to that I would say that in one case while experimenting we used the needle three times; once at the infra-orbital, once at the inferior dental, and once at the mental foramen. The mental was the only point where cocaïne was not injected, and that was the point that troubled the patient most after the needle was withdrawn. The soreness in that part remained for about two days. It was impossible to touch the nerve the first time, and the instrument was moved back and forth a little, and in that way it lacerated the parts enough to account for the unusual soreness there. I have not known of a single case, out of the thirty or forty in which we have injected this remedy, where the patient has complained of the needle causing pain as it passed through the tissues. After it passes the mucous membrane there is no pain.

Dr. Woodward. I should like to ask if Dr. Raymond has found any of these patients complaining of nausea after the remedy was injected?

Dr. Raymond. Only in one instance. One patient, a young girl, said she felt a little sick at her stomach, as she expressed it; but it did not amount to much, and lasted only about ten minutes. I would say that I have had one grain of cocaïne injected in my lower jaw at one time. The only effect it produced, so far as I was able to see, was an accelerated motion of the heart's action. That was quite perceptible. Other than that there was no effect produced, aside from the anesthesia of the face.

Dr. J. W. Thomson (physician). With reference to the suppression of pain by cocaïne or any other anesthetic, it may be desirable, or under certain conditions it may not. In surgical operations it is doubtless the true procedure to prevent shock and pain. In disease, however, where there is pain from inflammation or nervous disorder, the suppression of pain may prolong disease, or even worse—destroy life. In traumatic cases, when conservative operations are to be performed, anesthetization is doubtless a desideratum. But in disease that has expression without apparent outward cause, the employment of an anodyne will often inflict lasting injury by preventing reaction from the nerve centers. Pain in dynamic disease is the danger signal, and to arrest it by an anesthetic is only to destroy the watchful sentry, while the enemy makes havoc in the very citadel!

President Jarvie. At our last meeting we had a paper read by Dr. Beers, of Montreal, upon "Children's Teeth." There was hardly the opportunity given at that time for the discussion of the paper that some members would have liked, and we will devote a short

time to the discussion of that paper now. Dr. Dodge, have you anything to say upon that subject?

Dr. Dodge. I am willing to say a few words, although it hardly seems worth while to occupy much time with that subject this evening. I listened attentively to the paper, which was calculated to fix one's attention, and I have since had the opportunity of reading the manuscript. Dr. Beers presented us with a very engaging, and I might almost say fascinating, statement of an old theory, which for my part I consider very unsatisfactory. The paper as a paper I should pronounce admirable; but if we go beyond that, and take the views presented in it, it seems to me that the service Dr. Beers did us in presenting his paper was principally that of calling our attention to the need of investigating the causes of the excessive decay which appears almost at the beginning of infantile life, and which in many cases proves to be more than a match for all the dentist's skill as the years go on. I have my own ideas about where we are to look for the causes of this trouble, and if we were not promised other and perhaps more profitable occupation for the evening, I might trespass upon your patience far enough to make a little discourse upon them, but it can be deferred until some other time. I think we are indebted to Dr. Beers for bringing up the subject, and I am sure he presented his views in a manner that might stand as a model for papers of the kind; but I believe the old opinion, which was mainly what he presented, that the remedy for decay in children's teeth is to be found in supplying the mother with phosphates during gestation, is very inadequate and has very little basis in a sound physiology.

President Jarvie. We will now listen to Prof. Mayr, of Springfield, Mass., who is to speak upon

The Products of Putrefaction and Fermentation in the Mouth.

Prof. Chas. Mayr. The gentleman who read the paper on "Hydrochlorate of Cocaïne" had a great advantage in his subject. His subject is practical, means a direct saving of labor, of pain and worry; while that which I have to say is of less immediate importance, and is therefore not as likely to please as the subject we have just listened to.

The old difference of principles in the treatment of disease comes up again and again. "Is it better to prevent disease or to cure it?" I think it cannot be answered decisively in one sense or the other. The simple fact that diseases exist makes their absolute prohibition an impossibility. We may say disease is a part of the plan of the creation. On the other hand, the fact that we

undoubtedly are able to control some diseases proves that we are destined to master disease, and thus the world seems to be planned on a progressive system, which I might compare to a boiler, —the greater the inward pressure the better work a boiler will do, but the greater also must be the precautions to prevent accidents. The individual, like the whole universe, is one huge boiler,—the higher the pressure at which work is carried on the more work will be done, but the greater must be our precaution to prevent destructive effects upon the boiler itself. Thus, every evil of humanity is nothing but the necessary impulse for progress. Without evils we would have no progress. The whole progress of the world we owe to the "devil;" not to the yielding to the "devil," by allowing ourselves to drift with the influence that draws us down; but to the strength which we derive from combating it.

It is to a great extent the same with teeth. Will we have good teeth by keeping away from them every temptation of getting bad, or by continually exposing them to a moderate temptation, which probably will strengthen their resistance? Every organ which is not worked becomes weak; but this weakness is not shown in a single individual; only in the series of individuals which constitute a race. Thus, the teeth of one individual are far more the creation of his parents and ancestors than of his own life. He has no control over their growth beyond a slight amount, which unfortunately is almost always towards destruction. In my opinion the most important outward enemy which teeth have to combat, and in fighting which they derive their growth, is something living. Such living enemies are far more dangerous than the dead mechanical enemies. We have tamed the lightning, but we have not been able yet to conquer the little bacterium termo, which our most powerful lenses show us not to be more than a $\frac{1}{10000}$ of an inch. The bacterium has life; lightning has no such life. *Living* organisms produce those changes that we call putrefaction and fermentation, and to view them nowadays in any different light would be retrograding.

The most intelligent defender of the mechanical and purely chemical theory of fermentation was Justus von Liebig, a deep-thinking chemist, but a man who almost hated the microscope. He tried to explain everything by his equations, without taking into consideration the little organisms. His equations in their crude outline are correct, but they do not represent the explanation of the phenomena; they merely give us general facts about them. The French chemists, under the lead of Pasteur, took it upon themselves —I have no doubt partly from national antagonism—to defend the other view that micro-organisms were the essential part in decay. The war was fierce and long, but the German fermentative chemists

had to surrender. During this strife the German chemists tried to make out a most radical difference between fermentation and putrefaction, of which the then central point may be summed up thus: Fermentation is the peculiar breaking up of vegetable substances under the influence of ferments (circulus vitiosus), and putrefaction is the breaking up of animal substances under the influence of putrescent substances. This difference can now be worded more exactly by saying that fermentation is the decomposition of non-nitrogenous substances under the influence of micro-organisms, and putrefaction is the breaking up of nitrogenous substances under the influence of micro-organisms. To make the definition agree with the popular idea of both processes, we have to say that the products of putrefaction must be offensive to our senses to deserve that name.

By carefully examining all the different ways of breaking up of organic substances, we find very many varieties. One of them is putrefaction. Each of these varieties uses up a small amount of nitrogenous substances; and one of them, which might be termed a variety of putrefaction, breaks up the nitrogenous substance, urea. I will give a few varieties of fermentation and their products. The most important is that of sugar into alcohol and carbonic acid. We know exactly the fermentative plant which produces it. It is the yeast (schyzomycetes torula, etc). It has been found that one ounce of dry yeast will transform one-twentieth of an ounce of grape sugar into alcohol and carbonic acid in about twenty minutes. The yeast seems to be the type of drunkenness. If there are no more substances at hand to make alcohol from, the yeast makes the alcohol out of its own body! During the fermentation of alcohol a certain amount of sugar is transformed into glycerine and succinic acid. The budding of the yeast in an alcoholic fluid is not its propagation; the propagation takes place when the yeast is starving, a phenomenon which has analogies in human life.

Who of our citizens are most blessed with children,—those who enjoy all the luxuries of life, or those who can hardly keep souls and bodies together? The overwhelming percentage of children occurs in poor families, and sooner or later, by a natural process of lack of progeny, rich families are broken up and die out. Some lucky poor relative gets the wealth. He makes the wealth ferment, but loses power while enjoying the fermentation. For a couple of generations the old strength still holds good, until slowly but surely his family dies out to make room for others.

At certain conditions of temperature milk ferments and gives alcohol, but ordinarily milk undergoes another fermentation,—that called *lactic fermentation*, produced by a micro-organism of entirely

different habits and structure from that of the yeast. The product is lactic acid. This sour milk is easily digested, and while lactic acid pure and simple has not been found a very useful thing to eat, a certain amount of lactic acid in sour milk is easier digested than the corresponding amount of sugar of milk, which our stomachs always transform into lactic acid. If we allow sugar, chalk, and old cheese to stand for a certain time in summer temperature, a microscopic plant forms which produces *succinic* and *butyric* acids; in a similar manner other acids have been obtained.

In the variety termed ammoniacal fermentation, or "putrefaction of the urine," the urea is split up by a peculiar micro-organism into carbonate of ammonia and products which the little organism needs. Towards the later stages of all fermentative processes a new organism appears, very small but very powerful, the bacterium termo, which destroys the last destructible remnant of organic nature. Peculiar odors are generated during its existence, and *putrefaction* has begun. So long as the other processes take place with overwhelming masses of micro-organisms, we do not perceive very decidedly the products of putrefaction; but they exist all the same. These odors of putrefaction, so powerful and disagreeable, are not rare in the mouth.

According to the experiments of Dr. Miller, lactic acid is the one which disorganizes, decalcifies, and softens the plug of dead dentine in a carious cavity.

The following substances have been proved to be transformed by ferments: Glucose into alcohol and carbonic acid; lactose into lactic acid (two molecules); levulose (cane sugar) into lactic and carbonic acids; malic acid into succinic and carbonic acids; lactic acid into butyric and carbonic acids and hydrogen; cane sugar into arabine, mannite, and carbonic acid; urea into carbonic acid and ammonia; glycerine into propionic acid; tartaric acid into isopropionic acid; tartaric acid into butyric acid; malic acid into valerianic acid; succinic acid into valerianic acid; alcohol into acetic acid; albuminoids into leucine, tyrosine, amido compounds, etc.; mucic acid into acetic acid, etc.; citric acid into acetic acid, etc.; alcohol into glycerine; cane sugar into glucose, etc.

Quite different from these organized ferments, which, so to speak, manufacture their own chemicals and machinery for the decomposition of fermentable matter, are the unorganized ferments like ptyaline, pepsine, pancreatine, emulsine, diastase, etc. Even platinum belongs in this group. Poisons have no effect upon the latter ferments. *Simple acetate of potassa is one of the best germicides known*,—is far more powerful than arsenic, which has hardly any effect upon micro-organisms and ferments. Has our consumption of vinegar something to do with that? My time does not allow me to say more, but I

would like to call your attention to a little fact. Probably you have noticed that after eating sugar the teeth become covered with a scum. I thought it might contain elements of the teeth, etc.; so I scraped off a certain amount and analyzed it. These are the results:

	MILLIGRAMS.	PER CENT.
Total mass,	16	100
Water,	12	75
Organic starchy matter, sugar, etc.,	3.7	23
Inorganic salts,	.3	2
Residue faintly alkaline.		

Hence the substance derives very little, if anything, from the teeth.

I had a great number of facts observed and collected that I had tried to bring into a form that you would like; but I have an idea that the subject is altogether too chemical in detail and not of sufficient general interest, so I shorten my paper. If there is any point of interest to you that I have overlooked, I will with pleasure endeavor to answer any questions you may wish to ask in regard to it.

President Jarvie. Gentlemen, you hear Professor Mayr's request that you will propound some questions to him. He is filled full of the facts relating to fermentation and putrefaction.

Dr. Dodge. I will ask one question that has often suggested itself to me, and which has a peculiar emphasis in view of one thing the professor has said, and that is, What is the object of trying to establish a difference between fermentation and putrefaction? I fancy that putrefaction is fermentation that smells bad. Is there any other difference?

Prof. Mayr. Many say that fermentation is a process of plant life, and that putrefaction is a process of animal life. That distinction cannot be held good in all cases, for there is sometimes putrefaction in plants as well as in animal matter. If you moisten wheat flour and press out the cellulose and starch, you get a sticky mass of gluten; and if you let that stand in moisture and in a moderately warm temperature, it becomes as putrid as meat can ever be. The difference is merely an apparent one, raised for speculative purposes. It is also said that the products of fermentation are, as a rule, acid, while the products of putrefaction are alkaline; but in uric fermentation there is an evaporation of ammonia from the urine.

Dr. Howe. Has Prof. Mayr any suggestion to make with regard to controlling and preventing fermentation and putrefaction in the mouth?

Prof. Mayr. There are many ways of preventing fermentation, introduced by different inventors. Take the ferment of yeast; when we cool it down to about 35° F. it becomes inactive. From that point (when it begins to act) up to 130° F. it is active, but at 150° all its activity ceases. Therefore, in temperature we have one means of keeping down fermentation and putrefaction. When liquids are kept at a low temperature no fermentation sets in. Meat, butter, and milk are all preserved from fermentation or putrefaction in low temperatures. Another means is a high temperature. But, of course, these means cannot be used in the mouth. There we have to take away all the food for it. We only see where we fire a shot, but never know exactly where the bullet lands. We can apply any purifying substance in the mouth, but what do we really do? We are entirely in the dark. Let us get light in that direction, and investigate by every means the principles of these things. What do we know about the action of hydrochlorate of cocaïne? Why a certain agent acts in a certain way, is a far more important question than that it does. In preventing and removing fermentation I should avoid the continuous application of antiseptics. The old remedy, cleanliness, is sufficient for all cases,—it leaves just enough "bugs" to start an opposition. Under certain conditions human teeth are bound to go; their decay cannot be stopped. Human teeth have a kind of kismet that comes from the parents. In many cases school children are overworked, and their mental condition and nervous systems are disorganized; but their teeth are ruined because their parents did not give them any better ones. A man is not an individual by himself; he is entirely a product of parents. We have no proof whatever that suppressed pain may not turn out much worse than pain endured. We have the most remarkable reappearance in children of maladies which their parents had many years before. After a certain time a child gets neuralgia, and you hear the remark, "My mother had it exactly the same way." What is the connection of that neuralgia with the one the mother had thirty years ago? They say, "My teeth are going, and my father's went exactly that way. My back molars are all gone, and I remember hearing my father say he could not chew beef." This congenital defect in the teeth, or tendency to decay, is a far more important factor, in my opinion, than the processes of fermentation and putrefaction in the mouth. As a rule, dentists need not be afraid of fermentation in the mouth; it does but very little mischief beyond giving a bad breath. I think the congenital condition of the teeth is a far more important point for consideration than that of fermentation and putrefaction in the mouth.

President Jarvie. Prof. Mayr is obliged to leave in about three

minutes in order to catch the train for Springfield. I will just ask him one question,—whether these micro-organisms are the cause or the result of putrefaction?

Prof. Mayr. No putrefaction has ever been brought about without micro-organisms. That is a fact you cannot fight against. There is no putrefaction without micro-organisms. Professor Liebig, one of the greatest of chemists, tried to bring about putrefaction without those organisms, and he failed. We are not able to transform sugar into alcohol without giving to it the "little bug," in the form of a ferment. It is not possible to decompose a single tissue, in the way it is decomposed in the body, without that "little bug."

President Jarvie. The particular point of my question was, whether the bug comes first, or after putrefaction?

Prof. Mayr. The bug is always first. There have been made thousands of experiments to decide that point. Prof. Liebig thought he could surely produce putrefaction without the aid of these little insects, and he failed in all his attempts. At present we have no proof that putrefaction is possible without those organisms; but where bacteria termo are present you have putrefaction. Cases may occur where there seems to be putrefaction without the presence of these micro-organisms, but if thorough investigation is made it will be seen that the precautions were defective and that some little hole was left through which one or two crawled in and multiplied in there.

Dr. J. W. Clowes. I have often regretted the lack of chemical knowledge in my early education, believing as I do that an acquaintance with that science would have revealed to me more clearly the origin and processes of dental decay. We have listened this evening to a distinguished professor, whose fullness of learning is equaled only by his facility of expression. He has explained the generation and dissemination of odors, but has failed to divulge the practical fact of most interest to us. From this failure, and from like failure of others in this country and in Europe, to accomplish certainties, my faith is lessened, not in chemistry, but in the ability of the learned to supply us with knowledge. In philosophic minds the germ theory is at present a rampant idea, and the microbe variety of existence a teeming field for declaration and speculation. Through detective intensity and straining of vision, bacteria micrococci and bacillus have come to be a veritable "bee in their bonnets." These harmless "bugs" have been pursued, run down, and captured without adequate results. Their labors and their festivities alike have been unduly magnified. *Decay has been their opportunity, not their offence.* Highly versed as our learned friend is in chemical lore, he might, for our edification, have

"Dwelt on the affinities that bind—
The loosing of bonds by difference,
And the resolving back of matter
To its elements."

Instead of disturbing the microbe in his little pool, why did he not attack *tinctura ferri chloridi*, the most ruthless tiger of the laboratory lair? That it is a chemical creation is no reason for withholding his hand or muffling his voice. It is a public danger, and should be suppressed! When the burglar, with stealthy tread, under cover of the night, has entered your peaceful home and feloniously abstracted your money or your goods, you have suffered a loss; but it is not irreparable, for you still survive to enjoy life and its blessings. There is an inimical force that comes to our homes at all times. It has as ready admittance as ourselves. The most trusted friend of the family recommends and prescribes it, and his hands present it to our confidence and use. *This force is a chemical one, called "tincture of iron," and by the affinity of its acids for the lime in our teeth is a most certain destroyer of their substance. Under the promise of strength it belies our hopes, and by its power to demolish works irretrievable ruin to the very pillars of life!* If the tyro has discovered so much that calls for relief, why is the master in science voiceless and dumb? My brethren, I think you know the verities of what I speak. If you do not know, be more observant in the time to come, and when you shall see the dentures you have cultured and guarded and prized as the acme of your skill crumbling beneath some sudden and furtive blow, rise to the greatness of your position and combat, with all your might, so insidious and formidable a foe!

Dr. J. W. Thomson. Allow me to indorse the doubt as to whether fermentation and putrefaction are practically identical, as seems to be held by Prof. Mayr. I believe that, in the process of fermentation, when alcohol is produced fermentation ceases. Now, any putrefying substance immersed in alcohol will have its further putrescence arrested, and its animalcular life will cease developing. How can fermentation produce bacteria termo, when alcohol destroys or arrests the further development of all life that may be immersed therein? The theory of Dr. Koch and others, that disease is produced by germs, and in the case of cholera that you have nothing to do but destroy the bacteria, is, in my opinion, both false and misleading. I have yet to hear of a single case that has either been aborted or cured by a knowledge of that theory. We know that germs and low forms of life follow disease in highly-organized beings. In health, the organism throws off or resists the myriad forms of life that attack it in air, food, or other surroundings. It is

only when disease or death attacks the organism that the higher becomes the prey of the lower.

Dr. W. H. Dwinelle. I do not propose to give up the acid theory quite so freely. I think we have too many precedents in our history for us to yield to any new theory that has been suggested here to-night, although I am ever ready to embrace new truths, or rather such as supplement old ones. We are not warranted in ignoring the large experience which lies in the past history of our profession. The theory of bacteria, or of insects incident to fermentation, is all very well in its way, but it does not supplant the acid theory, which I believe in still. During a long period of practice I have observed that some patients lose more of their teeth in a single period of gestation than they have lost during the whole of their lives previous to that period, and I know beyond all controversy that they have lost them through the agency of the acridity of the secretions of the mouth and general system,—a system which has been vitiated, and necessarily so, for it seems to be in the order of nature that during the months of gestation the majority of women have acid secretions of the stomach, of the mouth, and an acid condition of the system generally. So we are warranted in believing that acids do play a very important chemical part in the decomposition of the teeth. Going back to our first principles of chemistry, we recognize that acids of the mouth do lay hold on the lime-salts, which are the basis of the teeth; carbonic acid gas is evolved, and the teeth are as legitimately decomposed by that acid as they would be if they were taken out of the mouth and put into a solution of any other chemical acid. We know this to be a fact, and we cannot ignore it. We are ready to accept new truths and new theories when they correspond with already established facts, but not otherwise. Acids will be acids still, alkalies be alkalies, and chemistry will be chemistry, the same as before. The fundamental law of nature, established from the begining, will reign supreme to the end. The new may be an advanced truth,—it may supplement, but it can never substitute it, for it can harmonize only with itself. We know that we are made up of chemical elements, we are microcosms, chemical and otherwise, of everything in nature; and so when we treat ourselves chemically we must consider the affinity of the chemical elements for each other. It is proper to use reagents, neutralizers, and resolvents; it is proper for us to use an alkali to balance or neutralize an acid. We know that our bones are chemical in their composition, and that we can produce chemical changes in the human system almost as readily as we can in the laboratory. I believe Dr. Clowes was entirely right in his proposition here to-night. It was objected to his theory of the cause of decay, that if it were true the action

of the acid would always be exerted first upon the lower teeth and its effects found there first; but my friend did not take into account the effect of capillary attraction, which equalizes the distribution of the fluids throughout the entire animal economy, by which acids will creep along the tissues to the superior maxillary and into the natural cavities, so to speak, between the teeth, where our trouble often begins. We are essentially chemical in our composition, and we can saturate our systems with certain chemical elements with almost mathematical exactness. The iodide of potassium is, in a large majority of cases, just as marked in its general effects upon the teeth as possible,—just as marked as the change produced when an acid and an alkali come in contact. When the system is saturated with iodide of potassium it often has the effect of grooving the teeth at the cervical borders just as legitimately as though they were grooved with a file. It is difficult for us to tell how nature grooves teeth by absorption, and produces this specific effect; we can only explain the matter in the indirect and inferential way in which it is done, by showing that it can be produced artificially and chemically.

It is well for us to correct, re-examine, and criticise our theories, but we must not throw them up until we are sure they are wrong. We have not learned all there is to be known; neither do the new-comers who step upon our platforms know it all. They are apt to be theoretical, and we should be practical, for we know what we know, and no amount of theory can militate against or annihilate the facts we have by long years of experience and observation established. So we must receive new doctrines that do not harmonize with these established facts with great caution.

Dr. Bogue. I agree with our friend, Dr. Dwinelle, heartily in this matter of the effect of gestation upon women's teeth. There is something else that has very much to do with the damage that is done to the teeth, and I feel like bringing up a case of that kind that I have had within twenty-four hours. A young man, about thirty-five years of age, has not taken the pains to apply the remedy that Prof. Mayr (I am glad to see) advocates,—that of thorough cleanliness between the teeth; but he gave that queerest kind of application of the brush that I have heard called "a lick and a promise" to his teeth, and a most noticeable result was reached,—namely, that wherever the stroke of the brush went there was absolutely no decay throughout the mouth; but in all the interstices, in the sulci of the teeth, and in the approximal surfaces and the semi-lunar curves formed by the gum,—in all those places that the brush does not hit,—there is such a decay existing as Prof. Mayr unfortunately said he did not believe took place, namely,

a *circular* decay, or semi-lunar shaped, at the margin of the gums. The main reason for my saying anything on that point is to call the attention of Prof. Mayr, by and by, to the fact that he has not drawn so much from practical sources as Dr. Dwinelle and others have. He has theorized too much as to the locality of decay in human teeth. And just here I regret that he is not present to answer as to whether he considers that, in dental decay, the acid has its first action upon the teeth, or the micro-organisms come first. I understood him to say that the "bugs are always first;" but I can hardly credit my ears, for it seems to me, from what I have read thus far, that we must have the action of an acid first, and then the micro-organisms appear as scavengers.

Dr. Kingsley. He puts it the other way.

Dr. Bogue. I hope to get an answer to that question from him.

President Jarvie. My question was, Are micro-organisms the result or the cause of putrefaction? He said they were the cause of putrefaction; that they were present previous to putrefaction.

Dr. Bogue. As these micro-organisms are present at all times, in health as well as in disease, I grant it; but I believe they will do no harm to the tooth until the enamel shall have been penetrated by chemical action, which chemical action is probably fermentative.

Adjourned.

E. T. Payne, D.D.S., *Secretary.*

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

Regular monthly meeting, held Tuesday evening, February 3, 1885, in the rooms of The S. S. White Dental Manufacturing Company, corner of Broadway and Thirty-second street.

The president, Dr. A. L. Northrop, in the chair.

Dr. C. F. W. Bödecker, chairman of the Clinic Committee, reported as follows: An interesting clinic was held to-day. The number in attendance was about forty. Dr. Kingsley exhibited a case of congenital cleft-palate restored by an obturator. Dr. Reese, of Brooklyn, exhibited some teeth in which he had inserted some of his metal with cement, the intention being to give more strength and anchorage to the filling. This method of inserting the Reese metal into the pulp-chamber with cement is claimed by Dr. Reese to be an advantage. Dr. Gerster presented a patient with a gun-shot wound. The gentleman, in attempting suicide, fired a 32-calibre bullet into his mouth. It passed through his tongue, perforated the soft palate, and lodged near the spinal column. Dr. Gerster saw the patient on the 9th of October, at the hospital where the operation of ligating the common carotid artery was performed. The princi-

pal object in presenting the patient was to show that such wounds in the mouth can heal by first intention, as this did. The perforation of the palate was hardly perceptible. The tongue was, of course, somewhat disfigured from the laceration of the bullet, which is yet situated near the spinal column. Dr. Cook, of Litchfield, Conn., presented some models of quite a young patient, who seemed to have worn away the front teeth to such an extent that they were so sensitive that she could not eat. It was the opinion of some of the gentlemen present that the Galvano cautery should be applied and the sensitiveness of the teeth thereby relieved. Dr. Starr, of The S. S. White Dental Manufacturing Company, exhibited some new forms of teeth. These teeth differ from the old molds in that the pin is inserted in the lower surface of the tooth instead of the posterior surface, in a space hollowed out of the tooth. It is claimed that these teeth will be very much stronger than the old form, and they are also of better shape. For use in this connection, the company has manufactured a special kind of rubber, which is pink on one side and red on the other.

Dr. Kingsley. One month ago to-day I saw a patient at the clinic who had an apparatus for restoring cleft-palate that had been in use only a very short time; when it was taken out of the mouth the patient spoke very imperfectly, but when the apparatus was applied she spoke exceedingly well. It was a marvel to me at the time, until I discovered what had not been announced up to that moment, that the case before us was not a case of congenital cleft-palate, but a case of acquired lesion, where an apparatus of the most simple character will produce instantaneous restoration of speech. I then called the attention of the gentlemen present to the fact that in cases of acquired lesion the difference in the speech of the patient there shown would be produced every time immediately on the application of a proper obturator; but that among cases of congenital cleft-palate I had never known an instance of restoration of speech immediately following the insertion of the apparatus. Under these circumstances I made considerable effort to present a patient at the clinic to-day, and if, when the obturator had been in place but half an hour, the patient spoke little or no better than before, it was showing practically what I had been trying to teach here a month before, that immediate improvement in speech in such cases of congenital cleft-palate could not be accomplished with any apparatus, and that the difference between an acquired lesion and congenital cleft-palate was as wide as the antipodes. It may be months before a patient like the one I had at the clinic to-day will be very much benefited in his speech, while one with an acquired lesion would be instantly and greatly benefited.

Dr. Bödecker. Dr. Weber will, at the next clinic, present a case of congenital cleft-palate, and will show how the method of Suersen operates in such cases, and explain the treatment and the apparatus so that anybody can construct it.

Incidents of Office Practice.

Dr. W. H. Atkinson. I spoke recently—I do not know but it was at the last meeting of this society—of a case of exsection of the right inferior dental nerve, and I wish now to speak further of it because it bears upon the action of cocaïne, and also upon the necessity of thorough operations where we extirpate nerves that are supposed to be the immediate source of neuralgic trouble. I believe I described the operation at that time, and I wish to confirm what I have heretofore said in regard to the advantage to be gained by the use of sterilized sponge where we desire new tissues to be formed. It will be three weeks to-morrow since the sterilized sponge was passed into the inferior dental canal and beyond the posterior foramen where the ramus of the jaw rises up. There has been no pus and no appreciable seruminal discharge from that point up to last Friday, when the patient left for her home; and I received a letter this evening stating that there had been complete absence of all pain, and expressing the strong conviction that she would be entirely cured of the neuralgia. She insisted that the former operation had not been carried far enough back. In this latter operation I burred through the whole length of the canal, cutting from the site of the transverse process dividing the second bicuspid and the first molar, through to the posterior foramen and out of it, so as to remove all the sharp border of the bone; then pressing the bur outwardly toward the ramus. At that point the patient made a motion to indicate that she was suffering, but it was only for an instant. She afterwards said she felt, at that moment, the same kind of "tick" she had felt before, but it was only instantaneous; it passed off, and that was the last of it. In the sterilization of the sponge, as I have heretofore stated in speaking of this operation, the water in the solution of bichloride of mercury was brought to the boiling point; but since that I have determined not to boil it again, but to raise the temperature only to 100° or 130° F., for the reason that when heated above 130° the sponge becomes too much shrunken to best accomplish the object. I have used it in a number of cases, and not in one single instance has there been any discharge of pus after the introduction was made permanently, and in every instance new granules have come into the sponge. But what becomes of the sponge I do not know. The important fact is that the wound heals with the best scar tissue that I have ever seen.

I propose to wait a little while before saying it is an absolute and complete cure. I have exsected nerves heretofore that have been subsequently reproduced, and a return of the neuralgia immediately followed the reproduction of the nerve. But I am confident that this will not be reproduced, unless it be through the scar tissue that has intervened where the sponge now lies.

Dr. Bödecker. I had a very interesting incident in connection with the use of cocaïne about four weeks ago. A patient of mine had four or five lower roots which, every time he closed his mouth, caused him severe pain, but which he had not had extracted because he belongs to the class of hemophilia, or "bleeders," who, when they are cut or wounded, find great difficulty in stopping the hemorrhage. Particular care is therefore necessary in attending to his teeth. This patient came into my hands about two years ago. A tooth had been removed for him, and he immediately went to the German Hospital, where he laid for five or six days without their being able to suppress the hemorrhage. Everything was tried that they could think of, and two dentists were called in to see what they could do, but without success, until Dr. Adler took a piece of cotton and held it in the wound for three-quarters of an hour, and as soon as he let go an assistant took his place, and then another, and in this way they finally stopped the bleeding and saved the patient's life. Soon after he came into my hands, his tongue and mouth being badly burned by chloride of iron, and the gum in a very bad condition. He was advised to have the other roots treated, but they were so loose that nothing could be done with them. Since then I have treated his gums, and they are now in a very nice condition; but the old roots annoyed him so much that the other night he said he could stand it no longer. He said he would rather die than not be able to eat any more. So I took out one of the roots. The hemmorrhage that resulted was very bad and persistent. I applied chloride of iron, but no sooner had I put the cotton in place than it was forced out again. I had read of cocaïne being an excellent styptic, so I moistened a pellet of cotton with the four per cent. aqueous solution, pushed it down and held it two or three minutes, and the patient has not lost a drop of blood since. I have used cocaïne in several instances where I had difficulty in getting at cavities where the gum impinged upon them, and it has never failed in a single instance to be an excellent styptic.

Another fact,—I have been using Wolrab's gold for about nine months, and I have looked upon it as the most wonderful preparation of gold that I have ever used. And so it is a beautiful preparation. But about three or four weeks since Mr. Johnston, of The S. S. White Dental Manufacturing Co., handed me some cylinders of

gold the touch of which is even softer than the Wolrab gold, and I congratulate the company upon its success in producing so fine an article, although for use by the Herbst method I do not like it quite as well as I do Wolrab's. I do not know but that is because I am accustomed to the use of Wolrab's gold. When put into the cavity it is not quite as stable as Wolrab's, but I suppose they will soon make it equal in that respect. They have made wonderful progress in the production of gold, and I am sure there will be no excuse hereafter for dentists not saving time by the use of the Herbst method of filling teeth.

Dr. F. H. Lee. I bought some oleate of cocaïne which was presented at the last clinic and recommended as a good preparation, but I have not had success with it in a single case; in fact it had no apparent effect whatever.

Dr. Reese. With regard to the teeth exhibited by Dr. Starr at the clinic this afternoon, I like the way in which they are constructed. I think they are well adapted to use with my plates, as the insertion of the pin underneath gives a nicer shape and would make a neater plate. A gentleman at the clinic remarked that in cases of short bite they would, perhaps, not do so well, but I believe that would not make any difference, as they could be made as short as needed. I think they are superior to the teeth we now have, if they can be made up in all shapes. I think the principle is a very beautiful one, but I do not think celluloid would make a good anchorage for those teeth.

Dr. La Roche. I think continuous-gum teeth may be fastened in the same way; and it seems to me that blocks could be made and attached with the same kind of fastening below. If that can be done, they will answer beautifully for rubber work in cases where it is necessary that the gums be shown.

Dr. W. H. Atkinson then read a paper entitled:

Does Pregnancy act as a Direct Antecedent to Decay of the Teeth?

Dr. Atkinson. Normal pregnancy is a natural process, and conducive to the highest functional activity of the entire body and mind. Exalted sensibility is the manifestation of high health, but this term is often used to indicate debility, and made to mark that fretful and peevish condition resultant upon overwork and underrest, or other irregularity of the working of mind and body.

Superficial observers are apt to attribute any lack of health to the most apparent present condition of those laboring under any malady; and, to tell the truth, this is the more easy method of

diagnosis. But is that a satisfactory basis for treatment? By no means. There have been strenuous efforts made of late to unravel the etiology of decay of the teeth, but the very multiplicity of "causes" named proves the efforts thus far inconclusive. In fact, the extant classification of disturbances of function called diseases needs thorough revision, rearrangement in more concise formulæ, or a new deal altogether, to make it understandable and possible to teach to others in the time now alloted to the studies necessary to obtain a degree in medicine. The foundation principles are alike in all schools of medicine, but the therapy is divided into as many interpretations of healing function as there are different schools, viz., antipathy, homeopathy, hydropathy, electropathy, etc., each with an assumption of knowledge of the mode and manner of action of each variety of remedy employed. This is the point of difficulty and also the point of importance. How does the remedy act or induce the factors of function to act under its administration and control? Emetics, cathartics, sudorifics, tonics, stimulants, sedatives, and alteratives are confidently prescribed by their advocates, who claim to understand their primary, secondary, and ultimate action upon the disease, as they say,—which they never *do*, with the single exception of those which antidote the poison which induces the so-called disease.

The first point to settle is to define disease, which will involve constitutional and local, or general and special, manifestations capable of being distinguished from normal and necessary nutrient changes, a somewhat complete survey of which will reveal to us that each individual disease and each body has its own special standard of normality that must be taken into account to make a correct diagnosis. Those who regard overfeeding and underworking as the prime sources of deflected function prescribe correction of habit, without also discerning overwork and under or poor feeding as initiatives of the want of functional harmony from which the patient suffers. May we not then safely say, any woman who is in the full vigor of natural endowment is *not* reduced in tone of functional activity of mind or body by becoming pregnant, and therefore not subject to decay of the teeth on this account? To be sure, such is the false education in "polite society," that pregnant women are in the habit of secluding themselves from view and giving up useful work, thus disturbing functional harmony of mind and body, and inducing debility and vacillation in the molecular changes requisite to health.

Medical education in the schools has been and is so crude as to only be able to detect *disease* by its mass-presence; in other words, not to detect disease at all, only the effects of its ravages upon some

considerable territory in functioning apparatus. I say "in the schools" with a specific intention to call attention to it, that it is in *practice* and not *didactic* teaching that experts are educated. The system of hospital and clinical study now practiced in many schools is not such as to enable the student to detect the initiative of the departure from health. Patients are sent to the hospitals or infirmaries *after* some great departure has drawn the attention of their associates, learned or unlearned, in such matters. To be sure, etiology is beginning to be studied with the purpose of laying bare the "causes," the very beginnings, of the changes called disease. I allude to the fashion of referring every change of function to a specific "microbe," "micro-organism," "micrococcus,"—any and all of which may *mark* stages of antecedents and sequences in functional changes, but never *cause* in any other sense than sequent of a previous change of functional current. It is fair to assume that all the so-called proofs of specificity of infection depend upon the introduction of a virus into an already debilitated body. This is proved by the fact of the non-inoculable character of persons in full health and action. It has become an aphorism with pathologists that "the innocent and timid are caught, while the robust and the wicked go on in exposure to infections uninfluenced." Where, then, are we to look for the beginnings of disease? Beyond all dispute, in the range of affinities which make up the sum of individual and societary personalities. Do you say,—but that is too fine spun and difficult of apprehension to be easily grasped and comprehended? The reply is, "Yes, yes! but we will never be able to intelligently abolish the diseases we deprecate until this field has been thoroughly conquered." Some one says, "Give us something practical." The answer is, to know how to antidote or avoid a mischief it must first be known in character and conduct. In the majority of cases in civilized society "pregnancy" is accompanied by a tendency to decay of the teeth. Much speculation has been indulged by medical men upon this subject. Even the common people have observed the fact and recorded it in the saying, "The mother loses a tooth for every child she bears." This might seem to concede that these were necessary and unavoidable conditions, and it is folly to attempt to remedy them. But I advocate, in most positive terms, that it is the duty of the dentist to attempt to save the teeth of pregnant patients with the same zeal he does those not in this state. It is to be acknowledged that, other things being equal, there is more difficulty and labor in doing it for pregnant women than for those not in that condition.

Materia medica is a record of observed results of remedies administered by accident or on purpose. These observed "facts" are subject to vary with the degree of ability, idiosyncrasy, and other peculiari-

ties of the person, and circumstances under which they occur. And if diversity of record be any criterion by which we should be governed in our own investigations, the catalogue of reliable remedies will be small indeed. One very strong factor in the action of a medicine is the will and confidence of the administrator in its efficacy. Another important consideration is the faith and willingness of the patient upon whom the remedy is to act. Were we to require a clear statement of how the drug acts upon the body or part, we should have to make many interrogation marks at the end of the majority of the statements of what are called "facts." For instance, who can tell us just how a cathartic, emetic, sudorific, stimulant, sedative, or alterative acts to bring about the proposed cure? The fact is, therapeutists are of so easy virtue as to take the verbal and written statements of others for granted rather than to pursue to the end of demonstration the query raised as to the molecular, tissual, organic, systemic, conscious, and affectional changes in health and disease. To tell just how any body or energy acts upon function and factor of function, we must comprehend that the classification be not of the article, but the sequence upon the system of its presence. The personal presence of friend, enemy, or he who comes to act as a healer of the maladies to which the patient is subject, may act as an emetic, cathartic, sudorific, stimulant, or sedative, simply by his bearing in look, word, manner, or manipulative management, without the administration of a drug called by any of these various names, in consequence of former administrations which were followed by these profluvia or other changes in function. From just such observations the different schools in medicine had their origin. The idea of specificity of effect attaching to identity of drug gave rise to the classifications of which I am complaining as inconclusive and misleading. This asserted specificity of effect of the substances given also led to another supposition also of specificity of origin of departures from normal actions in the system, and gave rise to classing diseases as general and specific. Under this head are found the diseases which depend upon the introduction of a morbific agent into the body, viz., syphilis, variola, scarlatina, measles, whooping-cough, etc. If the same law holds good in diseases of the teeth as in other parts, we will be justified in considering decay as possible only in such teeth as are imperfect in construction and nourishment, which debility lays them liable to infection by perceptible or imperceptible agency. This is the battle-ground of effort to arrive at the inception and progress of the disintegrating processes constituting decay. The degrees, then, of imperfection in structure and nourishment will mark the limits of possibility in arrest and cure. Where the debility is confined to particular por-

tions of the tooth-body, removal of that portion, and introduction of an indestructible substance sufficiently resistant to prevent wear, will effect the preservation of the tooth. But in case the weak spot be neglected until dissolution takes place, forming a cavity, and no attempt be made to arrest the progress of decay, extension is liable to invade the well-formed portions in most teeth. In cases where sickness of the whole system, especially aberrations in the chylopoetic tracts, have conduced to the commencement of decay in fissures and other secluded parts of the teeth, a return to health of the digestory apparatus often induces arrest of the decay by a return of the local nutrition, thus converting the softened tracts into reconsolidation through eburnification, leaving the cavities hardened and blackened and proof against further attacks of decay. It is this disturbance of the digestion in pregnancy which constitutes the special liability in such instances. If lactation be included in the term "pregnancy" in the caption of this paper, we may then catalogue increased liability to decay in pregnant women with a greater show of consistency and better comprehension of the mass appearance known as *decay*, which is the result of the finer and more obscure molecular changes accompanying formation and nutrition of the teeth and other organs of the living body.

Discussion.

Dr. W. D. Tenison. So far as my experience goes, I think there is positive evidence to us all that there is an absolute loss of lime substance in the teeth during pregnancy, and a softening of the tooth-structure followed by serious loss of teeth. The question is, What is the remedy? In this connection I would refer to a case in point, reported by Dr. George Watt in the *Ohio State Journal* for February, 1881, in which a remedy is suggested. It is in answer to a question that had been asked as to whether lime can be assimilated directly from the mineral kingdom. He says:

"Over thirty years ago Mrs. M. was the mother of two children whose temporary teeth decayed almost as rapidly as they grew. She had bad teeth, necessitating a full upper denture before she was thirty. When called to attend her she was three months advanced in her third pregnancy. We furnished her a supply of and advised her to use phosphate of lime (bone phosphate) freely, till the close of lactation. She complied with hopeful energy—used it on her bread and butter, used it daily, and many times a day. At first she was pale and emaciated, but soon she became robust and rosy. She had a short, natural labor, and her babe, weighing twelve and one-half pounds at birth (the mother weighing only one hundred), went all right through first dentition; no decays, and the permanent teeth were indeed excellent, and continued so till the age of twenty-five, since which we have lost knowledge of the case. Two children were born to her afterward. The phosphate was not used so long, nor in such quantities. Their

teeth were much better than those of the first two, but decidedly worse than those of the third. We have always believed the phosphate was in this case assimilated; but of course we prefer to gain it from the food proper; but if this source fail we try to supplement. Prof. J. Taft was quite familiar with the case of Mrs. M., and will recall it when we state that her husband lost his right hand by accident."

Dr. Atkinson's paper does not recommend a remedy other than exercise, proper food, etc. But where patients cannot avail themselves of these, what is the best thing to adopt in place of them? I saw the report of a case where phosphate of lime had been used without effect; though great success had been met with in the use of ordinary lime-water, both in regard to the teeth of children and those of adults.

Dr. G. S. Meigs. This subject is interesting to me, for I have a patient who is suffering seriously in that particular. I am under the impression that ladies in that condition are generally neglectful of their teeth. I had a patient who did not go near a dentist in four or five years, except to have a tooth extracted, and during that time she had three children. I found her teeth extremely sensitive and with numerous cavities, and she was sensitive in every way. In this particular case I think the trouble was largely due to neglect on the part of the patient.

Dr. Tenison. My theory in regard to this matter may be wrong, but it is this,—that during pregnancy, the mother having to nourish the fetus, there is an extraordinary demand made upon her system for lime-substance to form its osseous tissue, and if she does not get it in her food or in some other way she has to supply it from her own tissues; and in thus supplying it the other osseous tissues, being protected, do not suffer as much as the teeth do, which are softened by the withdrawal of their lime-substance, and rendered more subject to the action of the acids of the mouth and more liable to decay. That is my theory, and I think the remedy is the administering of some kind of lime preparation.

Dr. Atkinson. It is true that I did not go into the baby-feeding business in the paper, and I did not intend to. My purpose was to give you a few aphorisms that you could study when the paper was published, and then get more of their meaning and significance. We all understand that we must eat to live; but we do not understand the changes through which the food must pass, in order to make pure pabulum and good tooth-blood. But it is by observing the old nurses and mothers that we catch some of the finest instruction of which medical men have become possessed. The chief point of study in this question is the chylopoetic system, in which there is a secretion of some elemental products that are solvents of the food, and such ferments as are necessary in the process of churning it into

a homogeneous mass, which can then be converted into blood. Teething is a natural process, and should go on just as gently as the dew falls on the grass at night. If a child has a disturbance of the digestory apparatus, confine it to food that a child should feed on. Give it milk, and you may sometimes help the milk by putting a little lime in it. But do not boil the milk, under the pretense of scalding it; do not heat it above 130° F. If milk is heated above 133° it requires the expenditure of an amount of energy on the part of the digestory apparatus which it may not be able to supply. In such case an intelligent physician would give a peptone, some preparation of pepsin, holding a ferment that will promote the proper digestion of the food. Oftentimes you will see a mother that has an abundance of milk allow her baby to suck all the time, because she wants to get rid of the tension of the breast. Only healthy children have stomachs with vim enough to throw out the excess of food before it is coagulated. When the baby has green stools, give it soda. When you do not know what to do, do nothing, but hold still until matters develop, or ask counsel. Whether lime can be absorbed directly from the mineral kingdom or not is a very interesting question. We ought to think about it, and see if it is so, and how it is. When you find a mother complaining of heartburn, you proceed to find out what kind of improper food she has taken. But she may have taken the best of food, and have overworked herself, or become nervous or worried, and thus been thrown into such a state while the process of reproduction is going on as to produce an acidulated condition of the system. You must remember that there is no food we take into our stomachs but what has in it a sufficient amount of the elements necessary to build up the body, if the digestory apparatus is in proper condition to appropriate it. There is an abundant supply of lime and magnesia and iron, and all the rest of the elements, in the ordinary food we eat. We must study the processes by which food is churned in the stomach into chyme, and converted into chyle, pabulum, blood, and protoplasm, before we can talk intelligently about this subject at all. Let us be careful in setting down as proved postulates any mere side issues or suppositions.

Dr. G. W. Weld. This is a very important question, and the reader of the paper deserves no little credit for the able manner in which he has presented the details of the subject, and especially that part which relates to digestion. It is pretty clear to us all, I think, that during pregnancy there is a predisposition to caries of the teeth, and the observation of this fact has given rise to that old proverb, that has been alluded to this evening, "For every child a tooth." It seems to me that the prevalence of caries during pregnancy depends, to some extent at least, upon the co-existence of

what has been termed *acid dyspepsia*,—a condition of affairs in which there is an acidity and a vitiated condition of the oral secretions. In fact, it may be stated that, of all the nervous disorders which affect women during pregnancy, there is no one which is fraught with so much distress and even danger as that one which affects the secretions throughout the alimentary canal. Take, for example, vomiting, a symptom which generally subsides at about the end of the third or fourth month, or at least after quickening. Sometimes, however, the vomiting is persistent, commencing at conception and continuing throughout pregnancy. Now, in these cases of persistent vomiting, it not infrequently happens that there is a loss of appetite; the tongue becomes coated, the secretions throughout the alimentary canal extremely vitiated, the breath intensely fetid; extreme emaciation often supervenes, and if at the end of convalescence the teeth are not affected by caries it will be a miracle indeed. But aside from vomiting and heartburn, acidity, flatulence, diarrhea, constipation, and a number of other symptoms of disease co-existing with pregnancy, there is one which I think might well be mentioned, and that is the profuse and abnormal discharge which sometimes takes place from the salivary glands. When this occurs, as it not infrequently does, decay of the teeth will, to some extent, perhaps, depend upon the quality of the secretion,—whether it is acid in reaction or vitiated in character. But the condition of affairs which produces this profound nervous and constitutional disturbance, as well as the consequences which follow, is the thing to be considered; and I think in direct ratio to the extent of this profound constitutional disturbance is the extent, in a great many cases, of caries of the teeth. It seems to me that, if there is any doubt at all about the prevalence of caries during pregnancy, that doubt will be dispelled when we recall the fact that it has often been recorded that women have suffered with toothache *for the first time during pregnancy*, and that it often happens that a neuralgia may be clearly and distinctly traced to caries of the teeth. The question now arises regarding the proper treatment; and it is a question not easy to answer; yet I think a great deal can be done, although there now exists, both amongst medical and dental practitioners, great difference of opinion in the matter. Some believe that all operations upon the teeth should be postponed until after the birth of the child. But it seems to me that this should depend to a great extent upon what the operation is. Extraction I think should in all cases, if possible, be postponed, or at least not advised without due deliberation. The advisability of such operations depends altogether upon whether the suffering caused by toothache is likely to produce more nervous excitability and irritability than the operation required for its re-

lief. The dentist has it in his power to do a great deal in these cases for the benefit of the patient. In the first place, it is the duty of every dentist to examine his patients' teeth, provided, of course, that he knows the patient to be pregnant, one or two months before the time of delivery; the teeth should be thoroughly cleansed, all the tartar removed, and all cavities filled with gutta-percha, or some other grateful and soothing filling. The dentist can also do good by prescribing a proper tooth-wash,—some simple antacid solution, such as a solution of borax and bi-carbonate of soda, or simple lime-water, having the patient rinse the mouth with it two or three times a day during the months of pregnancy and those immediately succeeding delivery; or he can make a tooth-wash combining antacid, detergent, and astringent properties. I think that by so doing many teeth can be preserved which otherwise would, on account of pregnancy, be lost.

Dr. E. A Bogue. It has been said that it is useless to administer to pregnant women lime in any form, for the reason that the food taken is amply supplied with lime, and if they are unable to assimilate that it is useless to give them lime in any other form. I should like to ask Dr. Atkinson whether or not I speak correctly when I say, as I believe, that hypophosphites have been given in cases of non-assimilation, with the happiest results; and, if so, whether the administration of hypophosphites under those circumstances would not cover the ground, both of non-assimilation of lime and its supply?

Dr. Atkinson. Undoubtedly Dr. Bogue is correct; but when we see that the administration of any remedy is followed by manifest changes in the functioning capacities of the body, we are very likely to assume that the remedy was the cause of those changes, when in fact it may have been only coincident and incidental. The phosphates are so nearly allied to the perfect peptone produced by the digestory apparatus in a normal condition that they do save that amount of expenditure of digestory energy.

Dr. S. G. Perry. It is not unreasonable to assume that the inorganic particle must first pass through the vegetable kingdom before it can be assimilated. We normally depend for sustenance upon the animal and vegetable kingdoms; there is no escape from that. You turn a horse out in a barren field and he starves to death; but if you sow grain and allow the vegetable growth to transmute the inorganic particles of the soil into the best condition for assimilation, the horse will thrive. The point I want to make is that possibly we may be wrong in assuming that inorganic substances will be in that form assimilated.

Adjourned.

B. C. Nash, D.D.S., *Secretary.*

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

The regular meeting was held Saturday evening, January 3, 1885, at the office of Dr. J. D. Thomas, 912 Walnut street.

President Guilford in the chair.

Dr. J. D. Thomas read a paper entitled

The Practice of Extracting Teeth with Nitrous Oxide Gas as a Specialty,

of which the following is an abstract:

Dr. Thomas expressed his conviction that the inhalation of nitrous oxide acts primarily upon the nerve centers, first as a stimulant, then as a narcotic; that the discolored appearance of the patient while under its influence is due wholly to the accumulation of carbonic acid in the blood, independent of any change of the gas taking place in the lungs. He dwelt on the importance of a large and constant experience in its administration; on the use of fresh and pure gas, the closest attention to detail, and the discernment of the different stages of anesthesia, so that the operation should not be commenced too soon, nor be continued too long. If attention is given to these matters, the patient will know nothing of the operation, and there will be no unpleasant after effects. The best results in the administration of the gas can be secured by such an experience as comes only to one who devotes his entire time to this branch of practice. In large cities, therefore, its use has been generally abandoned by practitioners in favor of those who make it a specialty. The dentist is thus relieved of the anxiety which to a greater or less degree is felt in the giving of an anesthetic by one of limited experience. This arrangement also saves time to the dentist, and insures the performance of the operation in the most skillful manner, Twenty years ago an office was first opened in this city for the purpose of tooth-extracting as a specialty. The methods then adopted were not in strict conformity with professional ethics. Whole page advertisements and platform exhibitions were not calculated to gain the respect and confidence of the profession. The enterprise was in consequence slow to gain professional recognition, and the position of the specialist is still with many an equivocal one. The common argument is, that such practice is no part of dentistry, whose mission it is to save the natural organs. Such a practice certainly offers to one so disposed the opportunity to extract teeth that might be saved, and some there are who inconsiderately imagine that such is the daily practice of the specialist. It is claimed that it is only natural that he will not, contrary to his interest, advise the retention of a tooth which he is asked to extract; presuming him to be influenced solely by greed of gain. But as well might

such a charge of venality be made against the dentist or the physician whose interest it might be claimed would be to promote decay of the teeth, and delay recovery, for the sake of the fees to be thus gained. Dr. Thomas argued that the extracting specialist, provided he be a graduate in dentistry, bears the same relation to dental practice that the various specialists in medicine bear to its general practice. For himself, he disclaimed having ever advised the extraction of teeth which, in his judgment, could be saved if the patient was willing to submit to treatment. In forming a judgment as to the propriety of extracting a given tooth, several things have to be taken into consideration,—the character and condition of the tooth; the temperament, disposition, and pecuniary ability of the patient. It must be remembered that as a rule the patients coming to the specialist are a wholly different class of people from those who are under regular dental care, and that they usually come under great stress of pain.

Philadelphia has a population in round numbers of one million, and nearly three hundred regular graduates are engaged in the practice of dentistry. It is estimated that each dentist has an average of two hundred patients annually,—an aggregate of sixty thousand, say six per cent., of the whole number. Of the sixty thousand who have thus given attention to their teeth, eighteen hundred—say three per cent.—come to Dr. Thomas by their dentists' direction for extraction. This number does not by any means include all—perhaps not one fourth—of those among the sixty thousand who submit to extraction, for many operators do their own extracting, and some are sent to other specialists. But, granting that the eighteen hundred represented one half of those for whom extraction was deemed necessary, it follows that, notwithstanding all the attention and skill bestowed upon them, six per cent. of the patients under dental care have occasion to submit to tooth extraction.

It is possible that the above estimate has been made too low, but certainly an allowance of four hundred patients for each dentist would more than cover the average. This would aggregate one hundred and twenty thousand, or twelve per cent. of the population, under dental care; and allowing the same number of extractions, it would reduce the ratio to three per cent. Of the balance of the population thus inferentially not under the care of the dentist, the large majority labor under the impression that the only remedy for an aching tooth is extraction, and of such are a majority of those who come to the specialist. This class is capable of subdivision. Some who are unable or unwilling to pay for dental service avail themselves of the opportunities offered by dental colleges and dis-

pensaries, with no thought except of relief from pain by extraction. Many of the same class come to the specialist, and a suggestion that the tooth may be treated and saved is met with the query, "Will that stop the pain immediately?" and the information that preliminary treatment may require a little patience will settle the problem in favor of extraction at once. Occasionally one is thankful for such advice and acts upon it, but if he concludes that immediate relief is preferable to the salvation of the tooth, who can question his right to make the decision, or censure the operator for complying with his demand. Is extraction in such a case malpractice?

Again, many persons present who could well afford to pay the cost of dental operations, but who, from very ignorance of the value of their dental organs, have allowed them to decay past redemption; their rule being to have one tooth after another, as it becomes troublesome, extracted, until at last they present themselves with a view to having the others extracted in order to have artificial ones inserted. These patients generally come in great pain, probably with faces badly swollen, and with their minds settled upon extraction, with most of their teeth in such condition as to make immediate removal the proper procedure. Is it malpractice to accede to the demands of this class of sufferers? Of course a conscientious operator would advise the extraction of those only which are beyond treatment with any reasonable prospect of their being made comfortable, and the retention of the remainder. To advise such people that exposed pulps can be treated, defective teeth filled, and roots crowned would be time wasted.

In many instances there is no doubt that the health of the patient is vastly benefited by the removal of defective teeth and diseased roots which interfere seriously with the mastication of food.

There is another class having nervous temperaments with extremely sensitive teeth, who would rather lose a tooth than undergo the operation of filling. Another class is made up of those who, in spite of efforts for the preservation of their teeth, find only temporary benefit; and thinking their permanent preservation next to impossible, requiring frequent visits to the dentist, and considerable outlay of money, have lost heart, and so have determined not to waste time or money in further effort, but resort to extraction of the teeth when they are the cause of the pain. Dr. Thomas stated that he had received commendatory letters from dental practitioners for his discretion in refusing to extract in certain cases; and also letters of thanks from patients who had received from him their first impulse in the endeavor to save and restore to usefulness their dental organs. He asked special attention to two classes that are the only ones in which the specialist and the dentist are likely to be in antagonism;

at least such had been his experience. The first class is where a dentist has made an application to the recently exposed dental pulp of a patient not in hearty accord with the effort to save the tooth. If the pain continues longer than was expected, he concludes that it would be better to be rid of it, and rushes to the specialist, demanding extraction. If in such case a patient will not listen to advice, but insists upon extraction, is the specialist to be blamed for complying with his demand?

The other class of cases is where there has been a prolonged treatment of abscess; weeks, possibly months, of applications and dressings,—the dentist promising ultimate success; but the patient finding little if any improvement in the condition. At last, not from sudden impulse, but from the conviction that it will not pay to longer submit to the annoyance, and that the retention of the tooth will not compensate for the suffering and expense which the efforts for its care necessitates, he asks its immediate extraction. If under such circumstances the specialist urges perseverance and is met with an imperative order to extract the tooth, does not the responsibility for the operation rest with the patient? Is the professional integrity of the complying specialist open to criticism?

Discussion.

President Guilford. I assume that our members generally send their patients for whom extraction is necessary to Dr. Thomas, and we would like to know if they have any reports to make as to the effects of the gas upon them.

Dr. Darby. It is to me, and doubtless it is to others, a great relief to be able to send patients, when extraction is necessary, to one who is skillful and conscientious. I have known of several instances in which, under the pressure of pain, persons have desired the sacrifice of a valuable tooth, and have, at the earnest solicitation of Dr. Thomas, been induced to seek professional assistance in saving it.

Dr. Kirk. One question asked by Dr. Thomas deserves consideration,—that is, when a patient demands the extraction of an aching tooth, although advised against it, is it malpractice to let the patient have his way? I cannot see that it is. Many people cannot, or will not, endure such pain long, although assured that the tooth might be treated and saved; and if he should refuse to operate, the chances are that the patient would seek relief at the hands of another operator.

Dr. Jefferis. This question of malpractice is pertinent, and ought to be boldly met. No doubt Dr. Thomas has been unfairly criticised by operators who would not hesitate to extract such teeth

under like circumstances. Arguments with such patients is generally loss of time, without benefit to either party.

Dr. Register. The question asked by the essayist, whether a specialist is justified in extracting a tooth "under treatment," ought to be definitely settled. I do not think it good practice to allow a patient to decide what shall be done under any circumstances. Cases occur in which an operator has devoted a great deal of time in the effort to save a tooth, and when, perhaps, the result is almost secured, the patient, because suffering a little pain, goes to the specialist and demands extraction. Under such circumstances he should positively decline. If he complies, he not only deprives the dentist of his fee, but subjects him to the chagrin of failure.

Dr. Daniel Neall. A moral principle is involved in this question. If a patient comes day after day, suffering until his patience is exhausted, and when you fail to give relief goes to a specialist and demands the extraction of the tooth, will you condemn the specialist for giving to that patient the relief which you had failed to afford? As for myself, I would not refuse to extract a tooth under such circumstances.

Dr. Thomas. In regard to the extraction of teeth under treatment, I hold that under such circumstances as Dr. Neall has mentioned the specialist has a right to extract the offending tooth. I never advise the extraction of such a tooth; but, if the patient says, "I will not try any longer to save this tooth, and want it out," is it wrong for me to obey his directions? I would like an expression from the members,—shall I refuse in all such cases to relieve the patient?

Dr. Faught. My view of the matter is that, under no circumstances whatever, without the written consent of the dentist, should such a tooth be extracted. It places the practitioner in a mortifying position. After carrying out a line of treatment, and with success almost attained, to find that in the interval between two appointments the tooth has been extracted is certainly very unpleasant. I would not look upon any man as a reputable or conscientious practitioner who should thus step in and mar my work.

Dr. Darby. Dr. Faught's theory is very good as a theory, but does not work in practice. A patient may be perfectly satisfied with his dentist, and yet not be willing to suffer pain to please him. He may have confidence that he would be able ultimately to relieve him, but considering that he has borne the pain as long as he was willing to, he claims that the tooth is his own,—that he has a right to do what he pleases with it, and out it must come. The patient, under such circumstances, has simply exercised the prerogative which we all demand,—to do as he pleases with his own. I cannot

blame anyone for doing just what I would feel at liberty to do under similar circumstances. Our patients often suffer more pain than we would be willing to do if we were in their places. There is, however, a limit to the amount they will voluntarily endure, and because their limit is not ours, we should not censure them for going contrary to our wishes, nor censure the specialist who relieves them of their suffering.

Dr. Guilford. We should be glad to have an expression of opinion as to the after effects from inhalation of the gas. I have administered nitrous oxide several thousand times, and have never known any evil after effects. It will be remembered that Drs. Barker and Webb both declared that they had felt ill effects in their own persons.

Dr. Darby. Several persons have told me that they had never felt well since taking the gas.

Dr. Thomas. From my experience in the administration of the gas, I do not believe there are any ill effects whatever. I have never known a case of sickness which could be traced to the gas. Any nervous excitement will disturb the stomach of some patients, and some will sicken at the sight or even the thought of blood, and occasionally one comes whose stomach has been disordered from long suffering; but we do not have a case of sick stomach in the office once in six months. I have had some narrow escapes where patients, after inhaling the gas, have been taken ill with one or other of the eruptive diseases,—the sickness, until after the appearance of the eruption, being charged to the gas. In one case particularly, when by appointment the gas was to be administered in the afternoon, but was not, the patient died during the night, and if the gas had been given as intended, we should probably have had to bear the suspicion of having caused the death.

Dr. Register. I desire to be understood as not being uncharitable in regard to the extraction of a tooth under treatment; one should try and put himself in the patient's place. There are people to whom the retention of a tooth is nothing compared to the endurance of a little pain.

Dr. Wood. I appreciate the specialist most in those cases when the extraction of the sixth-year molars is imperative for the future welfare of the mouth.

Dr. Tees. I experimented considerably in the manufacture of the gas in 1863. I found that it required a great deal of care to prevent the white fumes of nitric oxide from being formed and passing over into the receiver. The presence of this noxious agent, and the then practice of allowing the patient to breathe in and out of the bag, had doubtless much to do with the unruliness of patients and

in causing the frightful dreams of which they complained. Modern appliances, new methods, and pure gas now prevent any ill effects. When a patient insists upon having a tooth out and will not heed saving counsel, I either extract it or remit the case to the specialist. It is the better practice to extract and at once give relief.

SECOND DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

At the annual meeting of the Second District Dental Society of the State of New York, held on Monday, March 9, 1885, at the office of Dr. L. G. Wilder, No. 54 Fort Greene place, Brooklyn, N. Y., the following officers were elected:

E. Parmly Brown, president; C. W. Harreys, vice-president; A. N. Roussel, recording secretary; F. T. Van Woert, corresponding secretary; L. G. Wilder, treasurer; D. S. Skinner, librarian; A. H. Brockway, Wm. Jarvie, C. F. Allan, O. E. Hill, and H. G. Mirick, board of censors; J. H. Holly and D. J. Fuller, delegates to State Society; W. H. Johnston (chairman), J. J. Pitts, and M. E. Elmendorf, executive committee; J. H. Race (chairman), Wm. Jarvie, and C. A. Marvin, committee on ethics.

The next meeting takes place on the second Monday in June, and will be held up the Hudson, probably at Poughkeepsie.

A. N. Roussel, *Recording Secretary*,
879 Gates avenue, Brooklyn, N. Y.

TENNESSEE DENTAL ASSOCIATION.

The Tennessee Dental Association held its nineteenth annual meeting in the lecture hall of the Dental Department of the University of Tennessee, Nashville, commencing February 24, 1885, and continuing three days.

The following officers were elected: H. W. Morgan, president; M. W. Williams, first vice-president; George Eubank, second vice-president; A. F. Claywell, corresponding secretary; R. E. Burns, recording secretary; W. H. Morgan, treasurer; W. L. Dismukes, D. R. Stubblefield, and J. S. Franklin, executive committee.

The next annual meeting will be held in the lecture hall of the Dental Department of Vanderbilt University, Nashville, on the last Tuesday of February, 1886.

Robt. E. Burns, *Recording Secretary*,
Nashville, Tenn.

NEBRASKA STATE DENTAL SOCIETY.

The ninth annual meeting of the Nebraska State Dental Society will be held at Lincoln, commencing Tuesday, May 12, 1885, the sessions continuing for three days.

W. F. Roseman, *Secretary*, Fremont, Neb.

ILLINOIS STATE DENTAL SOCIETY.

The twenty-first annual meeting of the Illinois State Dental Society will be held at Peoria, Ill., commencing Tuesday, May 12, 1885, and continuing four days.

The State Board of Dental Examiners will be at the National Hotel, at 10 A. M., Monday, May 11, at which time candidates for examination must present themselves punctually. The examinations will occupy until Thursday, May 14.

J. W. Wassall, *Secretary*,
No. 103 State street, Chicago.

GEORGIA STATE DENTAL SOCIETY AND EXAMINING BOARD.

The annual meeting of the Georgia State Dental Society and Examining Board will be held in Savannah, Ga., commencing on the second Tuesday in May, 1885.

L. D. Carpenter, *Cor. Sec.*, Atlanta, Ga.

FIFTH DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The Fifth District Dental Society of the State of New York will hold its seventeenth annual meeting at the Butterfield House, Utica, on Tuesday and Wednesday, April 7 and 8, 1885.

The sessions will be called to order at 2 P. M. Members of the profession from other societies are cordially invited to be present and take part in the discussions.

G. L. Curtis, *Rec. Sec.*, Syracuse, N. Y.

SEVENTH DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The seventeenth annual meeting of the Seventh District Dental Society of the State of New York will be held in Rochester, on Tuesday and Wednesday, April 28 and 29, 1885.

Members of the profession are invited to be present.

Chas. T. Howard, *Recording Secretary*,
224 E. Main street, Rochester, N. Y.

LAKE ERIE DENTAL ASSOCIATION.

The twenty-second annual meeting of the Lake Erie Dental Association will be held in Erie, Pa., commencing at 10 A. M., on Tuesday, May 5, 1885. The sessions will continue for three days.

A cordial invitation is extended to all members of the profession to be present. C. D. Elliott, *Secretary*, Franklin, Pa.

BALTIMORE COLLEGE OF DENTAL SURGERY.

THE forty-sixth annual commencement of the Baltimore College of Dental Surgery was held at the Academy of Music, Baltimore, Md., on Thursday, March 5, 1885, at 1 o'clock P. M.

The annual oration was delivered by Hon. William L. Wilson.

The class valedictory oration was delivered by Frank K. White, D.D.S.

The number of matriculates for the session was seventy-nine.

The degree of D.D.S. was conferred on the following graduates by Professor R. B. Winder, dean of the faculty:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Eugene F. Adair	Georgia.	J. C. Morgan	Kentucky.
H. Clay Anders	Maryland.	Herbert Phillips	Massachusetts.
John M. Anderson	Virginia.	C. G. Richardson	South Carolina.
J. A. Breland	South Carolina.	Phineas A. Sherman	Massachusetts.
G. P. Chapuis	France.	G. Marshall Smith	Maryland.
Thos. L. Cobb	Alabama.	W. B. Sprinkle	Virginia.
Ola B. Comfort	Pennsylvania.	J. M. Staire	Pennsylvania.
E. E. Early	Maryland.	Claude A. St. Amand	South Carolina.
C. H. Gatewood	Virginia.	N. A. Strait	Dist. Columbia.
H. H. Hafer	Georgia.	R. E. Sunderlin	New York.
J. E. Hancock	North Carolina.	J. H. Swartz	Pennsylvania.
M. Parke Harris	California.	Geo. S. Todd	Maryland.
L. Hedrick	California.	R. C. Warfield	Maryland.
Samuel H. Jones	New York.	F. K. White	Maryland.

OHIO COLLEGE OF DENTAL SURGERY.

THE thirty-ninth annual commencement of the Ohio College of Dental Surgery was held at College Hall, Cincinnati, Ohio, Wednesday evening, March 4, 1885, at 8 o'clock.

The annual address was delivered by Professor C. M. Wright, D.D.S.

The class oration was delivered by W. R. Edgar, D.D.S.

The number of matriculates for the session was fifty-five.

The degree of D.D.S. was conferred on the following graduates by W. Storer How, D.D.S., of the board of trustees.

NAME.	RESIDENCE.	NAME.	RESIDENCE.
G. F. Ambrose	Illinois.	Frank L. King	Pennsylvania.
John S. Chance	Ohio.	Geo. M. Kinsey	Indiana.
Charles Clark	Ohio.	J. Fred. Kruger	Ohio.
Walter L. Conkey	Wisconsin.	Carrie Lloyd	Indiana.
John W. Cosford	Michigan.	Ben W. McPhee	Colorado.
Albert Doerler	Ohio.	Louis G. Meyer	Ohio.
William Robert Edgar	Ohio.	James D. Moore	Ohio.
Charles P. Gray	Ohio.	J. E. Morton	Indiana.
Harry H. Genslinger	Ohio.	Adelbert T. Olmstead	Illinois.
Edward R. Hoff	Ohio.	A. W. Paffenbarger	Ohio.
C. R. Holt	Oregon.	Homer W. Pitner	Illinois.
W. P. Jackson	Ohio.	William M. Seeger	Wisconsin.
Harry M. Kempton	Ohio.	Jerome B. Williams	Wisconsin.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

The twenty-ninth annual commencement of the Pennsylvania College of Dental Surgery was held at the American Academy of Music, Philadelphia, on Thursday, February 26, 1885, at 12 o'clock M.

The valedictory address was delivered by C. Osborne Tupper, A.B., D.D.S., and the address to the graduates by Henry Leffmann, M.D., D.D.S.

The number of matriculates for the session was one hundred and thirty-six.

The degree of D.D.S. was conferred on the following graduates by S. W. Gross, M.D., president of the faculty:

NAME.	RESIDENCE.
I. H. F. Albrecht	Germany.
Deogracias Ascencio	U. S. of Col., S. A.
Thomas James Barrett	Massachusetts.
J. Irwin Bayles	New Jersey.
L. N. Bedford	Iowa.
Franz Binotsch	Germany.
William Blanc	New Jersey.
Librado Borja	Mexico.
Carlos Bonilla	Nicaragua, C. A.
Johanna von Bremen	Germany.
Frederick H. Brown	New Hampshire.
Frank P. Cobourn	Prennsylvania.
William B. Conner	Ohio.
Frank G. Cooper	Pennsylvania.
Alex. J. Culbertson	Pennsylvania.
Samuel B. Detweiler	Pennsylvania.
Carlton L. Dobbins	New Jersey.
James M. Easton	Pennsylvania.
Herbert H. Emley	New Jersey.
Edward A. Ferbach	Germany.
Frank R. Fisk	Minnesota.
Henry J. Fisk	Connecticut.
Elmer E. Fleming	Pennsylvania.
J. Glen Fling	Pennsylvania.
Oscar Gerdtzen	Chili, S. A.
Rudolph Gilgenberg	Germany.
Paul L. Gibson	New York.
Leon Goble	New Jersey.
Paul Guye	Switzerland.
Charles F. Hager	Pennsylvania.
Eugene C. Honeywell	Pennsylvania.
Mason P. Harvey	Maine.
Towsend H. Jacobs	Minnesota.
J. Stewart Jackson	New York.
F. H. Kendrick	Massachusetts.
Richard Knobelsdorff	Germany.
Paul Karrer	Switzerland.
Alfred H. Little	New York.
Oliver P. Lund	Pennsylvania.
Richard Longe	Germany.
Percival E. Loder, M.D.	Pennsylvania.
Roscoe Murphy	New Jersey.
A. How'd Macpherson	New Jersey.
John A. McClellan	Ohio.
Ferdinand E. Mueller	Germany.
E. M. S. McKee	Pennsylvania.
Rush J. McHenry	Pennsylvania.
Willmer D. McKissick	Pennsylvania.
George C. Moore	Pennsylvania.
Samuel E. Marshall	Delaware.
Herman Reamer	Pennsylvania.
Delfin F. Restrepo	U.S. of Columbia
David S. Reed	Pennsylvania.
Anna B. Ramsay	Pennsylvania.
Albert Rentzing	Germany.
William F. Ravel	France.
Marvin L. Rowe	Canada.
Alfred Steiger	Switzerland.
William S. Sullivan	Wisconsin.
George H. Swift	Vermont.
E. A. Shulenberger	Pennsylvania.
Edgar W. Smith	Maryland.
Michael Jos. Spahn	Germany.
Wilhelm Seltzer	Germany.
David P. Tait	Pennsylvania.
C. O. Tupper, A. B.	Canada.
Charles E. Walrad	New York.
Henry Weston	Pennsylvania.
Frank W. Williams	Massachusetts.

PHILADELPHIA DENTAL COLLEGE.

The twenty-second annual commencement of the Philadelphia Dental College was held at the Academy of Music, Philadelphia, on Saturday, February 28, 1885, at 8 P. M.

The address to the graduates was delivered by Professor S. B.

Howell, M.D., D.D.S., and the valedictory address by W. R. Mail, D.D.S.

The number of matriculates for the session was one hundred and twenty-nine.

The degree of D.D.S. was conferred on the following graduates by the president of the board of trustees:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
George H. Adair	New York.	Horace G. Lawson	Canada.
A. S. Bailey	Massachusetts.	Martin H. Lutz	Pennsylvania.
William Baylor	New York.	Edwin R. Magnus	Connecticut.
Noah S. Borneman	Pennsylania.	William T. Mahon	Pennsylvania.
Edward H. Buckland	Massachusetts.	W. R. Mail	Indiana.
C. J. Cameron	Pennsylvania.	Addison S. Melvin, Jr.	Illinois.
Leopold A. Carter	Australia.	Calvin R. Moulton	California.
J. E. Cartland	North Carolina.	Bruno Albert Nernst	Germany.
William G. Chase	Delaware.	Robert H. Nones	Pennsylvania.
Ernest Cohen	Germany.	Frank Delavan Norton	New York.
George Eadie	Canada.	George D. O'Neil	Australia.
George F. English	New Jersey.	John F. O'Neil	Iowa.
Mary E. Fetherolf	Pennsylvania.	Allison J. Parker	Massachusetts.
H. A. Fynn	New York.	Myron F. Parmley	Iowa.
Isaac A. Goldsmith	South Carolina.	Charles M. Porter	Pennsylvania.
Harry P. Griffith	Pennsylvania.	Edward W. Pratt	Connecticut.
William B. Griswold	Connecticut.	James J. Ryan	Massachusetts.
Henry J. Harwood	France.	Albert H. Schildt	Wisconsin.
Franklin L. Henry	Canada.	Forbes C. R. Scott	France.
Burton E. Hoover	Pennsylvania.	William S. Sherman	Rhode Island.
Robert Sutcliffe Ivy	England.	Frank M. Swain	Illinois.
A. W. Jamison	Pennsylvania.	Louis Teichmann	Germany.
Victor P. Janin	France	Edgar W. Thompson	New York.
Myron D. Jewell	New York.	Charles P. Tuttle	New Jersey.
Samuel H. Johns	Delaware.	R. F. Verrinder, M.D.	California.
R. Frank Jones	New York.	Hugh Walker	Canada.
Augustus D. Josselyn	Maine.	Frank W. Wolf	Illinois.
Leonard F. Kellogg	Iowa.	Hiram M. Wolf	Illinois.
Morris Zeadler	Russia.		

MISSOURI DENTAL COLLEGE.

At the recent annual commencement (the nineteenth) of the Missouri Dental College, at St. Louis, Mo., the degree of D.D.S. was conferred on the following graduates:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
J. H. Bland	Missouri.	H. C. Miller	Missouri.
G. V. Collins	Illinois.	S. T. Neill	Missouri.
C. B. Helm	Illinois.	W. H. Wright	Missouri.
M. D. La Croix	Illinois.	T. A Williamson	Minnesota.

KANSAS CITY DENTAL COLLEGE.

The annual commencement of the Kansas City Dental College was held in the First Baptist Church, Kansas City, Mo., on the evening of Tuesday, March 17, 1885.

The following are the names of those successful in passing the examination, and upon whom the degree of D.D.S. was conferred:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
W. M. Dunning	Kansas.	John E. Crozier	Missouri
H. I. Parr	Kansas.	J. W. Buchanan	Missouri

NEW YORK COLLEGE OF DENTISTRY.

The nineteenth annual commencement of the New York College of Dentistry was held at Chickering Hall, New York City, on Monday evening, March 9, 1885.

The valedictory was delivered by Louis A. Queen, D.D.S., and the address to the graduates by J. Smith Dodge, Jr., M.D., D.D.S.

The number of matriculates for the session was one hundred and sixty-five.

The degree of D.D.S. was conferred on the following graduates by M. McN. Walsh, Esq., president of the board of trustees.

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Fremont Allen	New York.	Henry J. Hull	New York.
Lyndon C. Allen	New York.	Lyman S. King	New York.
Wm. F. Atkinson	New York.	Daniel W. Kleinhaus	New Jersey.
Louis Arndt	New Jersey.	Leonard K. Knox	New York.
Enrique G. de la Beldad	Spain.	Allan S McDougal	New York.
Ramon G. de la Beldad	Spain.	Joseph W. Moore	New York.
Lemuel P. Blair	Maine.	Wellslake D. Morse	New York.
Max R. Brinkman	Massachusetts.	Charles J. Mooney	New York.
Herbert W. F. Cady	New York.	Henry L. O'Brien	New York.
Robert H. Cochran	Massachusetts.	Frederick W. Pape	Germany.
Frank S. Crane	New Jersey.	Virgil F. Parker	New York.
Martin Degenhardt	New York.	Louis A. Queen	New Jersey.
Arthur Dodge	Connecticut.	Julius W. Rivinius	New York.
John Dünges	Germany.	Livingston J. Roberts	New York.
Charles H. Eagleton	New York.	John Roberts	Wales.
Thomas A. Fitzpatrick	New York.	Joseph N. Shenstone	New York.
Edward S. Fonda, M.D.	New York.	Samuel Simon	Massachusetts.
Frederick W. Gibbs	Connecticut.	Karl C. Smith	New York.
Arthur F. Hawes	New Jersey.	Charles R. Smith	New Jersey.
Ignacia V. Herrera	Cuba.	Arthur L. Swift	New Jersey.
George J. Harnung	New Jersey.	Louis M. Villalon	Porto Rico.
Joseph M. Henriques	West Indies.	Johan A. Theo. Weber	Finland.
Charles W. Howard	New York.	William M. Wyant	New York.

UNIVERSITY OF TENNESSEE—DENTAL DEPARTMENT.

The seventh annual commencement of the Dental Department of the University of Tennessee was held, in connection with that of the Medical Department, at Nashville, February 24, 1885.

The salutatory address was delivered by Robert S. Griggs, D.D.S.; the valedictory by Richard L. Smith, M.D.

The number of matriculates for the session was twenty-nine.

The degree of D.D.S. was conferred on the following graduates by Hon. John L. Moses, president of the board of trustees:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Samuel B. Anderson	Tennessee.	Robert S. Griggs	Georgia.
A. Y. Cartwright	South Carolina.	H. D. Harper	North Carolina.
T. S. Cartwright	Kentucky.	Hardy B. Harrell	Georgia.
Southall Dickson	Tennessee.	John F. Johnston	Mississippi.
George W. Dodson	Tennessee.	John A. Lee	Tennessee.
James M. Glenn	Tennessee.	Miles M. Puckett	Georgia.
M. E. Shelton	Missouri.		

INDIANA DENTAL COLLEGE.

The sixth annual commencement of the Indiana Dental College was held in the college lecture-room, Indianapolis, on March 4, 1885.

There were twenty-seven matriculates during the term.

The degree of D.D.S. was conferred on the following graduates :

NAME.	RESIDENCE.	NAME.	RESIDENCE.
William C. Archer	Indiana.	Frank H. Horner	Pennsylvania.
William H. Bucher	Indiana.	Marshall M. Keep	Pennsylvania.
Frank Dowd	New York.	B. G. Miller	Michigan.
John E. Davis	Indiana.	James W. Prall	Indiana.
William R. Dunn	Indiana.	J. Monticello Sprinkle	Indiana.
Fred. H. Emmerling	Wisconsin.	George W. Tainter	Missouri.
Gust. Weinmann	Pennsylvania.		

VANDERBILT UNIVERSITY—DENTAL DEPARTMENT.

The sixth annual commencement exercises of the Dental Department of Vanderbilt University were held in the chapel of the university, Nashville, Tenn., on Wednesday, February 25, 1885.

The charge to the class was delivered by W. H. Morgan, M.D., D.D.S., and the address on the part of the class by George W. Stokes, D.D.S.

The number of matriculates for the session was fifty-five.

The degree of D.D.S. was conferred on the following graduates by L. C. Garland, chancellor of the university:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
Charles F. Barham	Arkansas.	Jessee W. Shoemaker	Alabama.
Geo. C. Cooper, M.D	England.	Geo. W. Slaughter	Alabama.
Jonathan A. Ellard	Alabama.	Lawrence A. Smith	Mississippi.
John W. Fambrough	Georgia.	Geo. W. Stokes	South Carolina.
Frank H. Field	Georgia.	John T. Taylor	Tennessee.
James A. Frazier	Alabama.	Tyra F. Tynes	Mississippi.
David R. Garrison	Texas.	Joseph W. Peete	Florida.
Fred. W. Gradolph	Ohio.	Pinckney L. Weekley	South Carolina.
Edwin L. Hays	Kentucky.	Thomas C. West	Mississippi.
Wm. H. Hogshead	California.	Sheridan A. Williams	South Carolina.
Robt. H. McNair	Mississippi.	Lucius D. Wright	Tennessee.
Wm. C. Naff	Tennessee.	John Wood, L.D.S., R.C.S., Edinburg and Ireland, of Dumfries, Scotland.	
Clarence V. Rosser	Georgia.		

The *ad eundem* degree of D.D.S. was conferred on James S. Franklin, M.D., D.D.S., of Tennessee.

MINNESOTA COLLEGE HOSPITAL—DENTAL DEPARTMENT.

At the annual commencement of the Minnesota College Hospital, held in Minneapolis, Minn., on the evening of February 27, 1885, the degree of D.D.S. was conferred on the following graduates in the Dental Department: John H. Spaulding, John H. Dwight, and Charles L. Opsal, all of Minnesota.

UNIVERSITY OF MARYLAND—DENTAL DEPARTMENT.

The third annual commencement of the Dental Department of the University of Maryland was held at the Academy of Music, Baltimore, Md., on Tuesday, March 17, 1885.

The reading of the mandamus was by the dean, Professor F. J. S. Gorgas, M.D., D.D.S.,

The annual address was delivered by Professor R. Dorsey Coale, Ph.D.

The number of matriculates for the session was seventy-four.

The degree of D.D.S. was conferred on the following graduates by Hon. S. Teackle Wallis, LL.D., provost of the university:

NAME.	RESIDENCE.
Madison A. Bailey	South Carolina.
E. Payson Beadles	Virginia.
Henry Clinton Bradford	Virginia.
Claude D. Brown	Virginia.
John P. Carlisle	South Carolina.
Joseph W. Carter	Missouri.
Thomas M. Comegys	Tennessee.
Frank J. Cooke	Texas.
Willie Edward Dorset	Virginia.
Joseph Fournier, Jr.	New York.
Ferdinand Groshans	Maryland.
Charles W. Hebbel	Maryland.
John W. Helm	Maryland.
Charles E. Hill	Australia.
Ulysses S. Hougland	Indiana.
Clarence H. Howland	D. Columbia.
A. Hersey Howlett	Pennsylvania.
Peyton Hundley	Virginia.
Eli E. Josselyn, M.D.	N. Brunswick.
John S. Kloeber	Virginia.
Augustus Matthews	North Carolina.
Robert T. McQuown	Virginia.
William P. McQuown	Virginia.
Wm. McIntosh Norwood	South Carolina.
Will W. Parker	Minnesota.
Henry Clay Pitts	North Carolina.
Capers D. Perkins	Georgia.
James M. Ranson, Jr.	West Virginia.
Brooks Rutledge	South Carolina.
Charles T. Schaer	Maryland.
Wm. Sherman Trapp	Pennsylvania.
Fred. A. Twitchell	Minnesota.
Albert Wangemann	Germany.
Floyd J. Welch	Virginia.
William F. Wegge	Wisconsin.
Frank Le Roy Wood	Maine.

UNIVERSITY OF IOWA—DENTAL DEPARTMENT.

The third annual commencement of the Dental Department of the State University of Iowa was held in the Opera House, Iowa City, Iowa, on Monday evening, March 2, 1885.

The annual address was delivered by Hon. John T. Stoneman, and the valedictory by Emory L. Brooks, D.D.S.

The number of matriculates for the session was thirty-five.

The degree of D.D.S. was conferred on the following graduates by President Pickard:

NAME.	RESIDENCE.
Emory L. Brooks	Iowa.
Henry Clemens	Iowa.
H. M. Dalzell	Iowa.
L. K. Fullerton	Iowa.
G. E. Fisher	Iowa.
H. A. Harlan	Iowa.
John P. Hunt	Iowa.
J. C. Holland, M.D.	Iowa.
J. C. Mitten	Iowa.
H. M. McAlister	Iowa.
J. A. Ross	Iowa.
F. H. Rule	Iowa.
H. H. Smith	Iowa.
J. L. Small	Iowa.
C. G. Thomas	Iowa.
S. R. Wagoner	Montana.

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

The sixteenth annual examination of the Royal College of Dental Surgeons of Ontario was completed on March 6, 1885. No commencement exercises are held. The examinations being entirely written, no thesis is required.

There were twenty-four students attending lectures throughout the session.

Certificates of license to practice dentistry in Ontario and the title of L.D.S. were granted to the following gentlemen, viz.:

NAME.	RESIDENCE.	NAME.	RESIDENCE.
John F. Adams	Toronto.	G. A. Teeple	Amherstburg.
A. H. Cheeseborough	Toronto.	C. G. Thompson	Pictou.
R. F. Morrow	Lindsay.	A. H. Weagant	Cornwall.
W. W. Patterson	Paris.		

EDITORIAL.

HILLISCHER'S DENTAL NOTATION.

Dr. H. Th. Hillischer, of Vienna, Austria, in a communication to the Dental Cosmos, proposes for general adoption a system of symbols for the graphical designation of the human teeth in their several positional relations after eruption, providing also for the record of defects in, operations on, substitutes for, or malpositions of individual teeth.

For the permanent teeth, four groups of eight numerals are arranged as follows:

$$\frac{8\cdot,7\cdot,6\cdot,5\cdot,4\cdot,3\cdot,2\cdot,1\cdot \;\Big|\; \cdot1,\cdot2,\cdot3,\cdot4,\cdot5,\cdot6,\cdot7,\cdot8}{8\cdot,7\cdot,6\cdot,5\cdot,4\cdot,3.,2\cdot,1\cdot \;\Big|\; \cdot1,\cdot2,\cdot3,\cdot4,\cdot5,\cdot6,\cdot7,\cdot8}$$

The respective teeth of the upper or lower jaw are indicated by the position of the numerals above or below the horizontal line, and their situation relative to the median line is shown by points on the median-line side of the figures.

For instance, $\underline{1\cdot}$ represents the superior right central, and $\overline{\cdot2}$ is the symbol of an inferior left lateral. It is mnemonically easy to remember that a figure *above* the line stands for an *upper* tooth, and a figure *below* the line for a *lower* tooth; while the *right* side of the median line of both jaws is indicated by a *point* on the *right* side of a figure, and the *left* by a *point* on its *left* side.

$\frac{5\cdot,\cdot3}{6\cdot,\cdot4}$ is a group of symbols representing the superior right second bicuspid, and left cuspid, the inferior right first molar and left first bicuspid in their normal positions and conditions.

A carious cavity, defect, filling, or substitute may be denoted by

an initial letter before or after a symbol, and bearing the signification indicated in the following table:

a.	—Artificial substitute	on plate of any kind.
b.	—Buccal	position or cavity.
c.	—Coronal	cutting or grinding surface, or cavity.
d.	—Distal	position or cavity.
e.	—Erosion	
f.	—Filling	of any material.
i.	—Irregular	position.
l.	—Labial	position or cavity.
m.	—Mesial	position or cavity.
p.	—Palatal or Lingual	position or cavity.
pp.	—Pulp	
r.	—Root	
s.	—Supernumerary	
t.	—Treated	
x.	—Extracted	

Compound cavities may be described by combining the letters within parentheses, as for instance, $\underline{\cdot\ 3\ (\text{l d})}$ is the notation for a labio-distal cavity in the superior left cuspid, while the same formula with the parentheses omitted—$\underline{\cdot\ 3\ \text{l d}}$—represents distinct cavities, one labial and the other distal in aspect.

When a substitute is to be indicated, the record may be made in this form, $\underline{\cdot\ 2\ \text{a}}$, which signifies an artificial superior left lateral mounted on a plate of any kind, and a group of such teeth would be noted in this way: $\underline{4\ \cdot\ \text{a},\ 1\ \cdot\ \text{a},\ \cdot\ 6\ \text{a}}$,—reading, "a superior right first bicuspid, right central, and left first molar, mounted on a plate." If the case is that of a root carrying an artificial crown, then the formula would be this $\underline{\cdot\ 1\ \text{r a}}$, signifying an artificial crown on a superior left central root.

$\underline{2\ \cdot,\ 2\ \cdot\ \text{s i p},\ 1\ \cdot}$ is the graphical expression for a supernumerary superior right lateral in an irregular palatal position between the central and lateral. If in line with them the formula would be $\underline{2\ \cdot,\ 2\ \cdot\ \text{s},\ 1\ \cdot}$. Obviously any dental irregularity or malposition may likewise be noted.

The same system is applicable to the deciduous teeth by employing for distinction the colon, or double point: preserving, to avoid confusion, the relative significations of the numerals of the permanent set. The deciduous diagram is thus expressed:

$$\begin{array}{c|c} 7:,\ 6:,\ 3:,\ 2:,\ 1: & :1,\ :2,\ :3,\ :6,\ :7 \\ \hline 7:,\ 6:,\ 3:,\ 2:,\ 1: & :1,\ :2,\ :3,\ :6,\ :7 \end{array}$$

The following example is a representation of the dental aspect of a child seven years of age, exhibiting: In the superior maxilla the permanent centrals, left lateral, right first molar, coronally carious;

left first molar, confluently carious on its mesial, coronal, and distal surfaces; the deciduous right lateral, distally carious; right cuspid; right first molar, mesially carious; right second molar, coronally carious; left cuspid, distally carious; left first molar roots; left second molar: In the inferior maxilla, the permanent centrals and laterals; right first molar, coronally carious; left first molar, coronally and distally carious; deciduous cuspids; right first molar roots; right second molar, distally carious; left first molar, buccally carious; left second molar, coronally carious:

$$\begin{array}{l|l} 6 \cdot \mathrm{c},\ 7 : \mathrm{c},\ 6 : \mathrm{m},\ 3 :,\ \mathrm{d}\,2 :,\ 1 \cdot, & \cdot 1,\ \cdot 2,\ : 3\,\mathrm{d},\ : 6\,\mathrm{r},\ : 7,\ \cdot 6\,(\mathrm{m\,c\,d}) \\ \hline 6\,\mathrm{c},\ 7 : \mathrm{d},\ 6 : \mathrm{r},\ 3 :,\ 2 \cdot,\ 1 \cdot, & \cdot 1,\ \cdot 2,\ : 3,\ : 6\,\mathrm{b},\ : 7\,\mathrm{c},\ \cdot 6\,\mathrm{c\,d} \end{array}$$

The whole scheme is clearly comprehensive, and by its means the most complex as well as simple dental aspects and operations may be represented and described in the smallest space, least time, and simplest manner.

In further illustration of its uses, Dr. Hillischer says: "If, for instance, I wish to give a patient that I have examined over to an assistant for operative purposes, I sketch the work to be done thus:

$$\begin{array}{l|r} 8 \cdot,\ 5 \cdot,\ 4 \cdot,\ 1 \cdot, & \cdot 1,\ \cdot 6,\ \cdot 7 \\ \hline 6 \cdot & .\ 6 \end{array}$$

or, more fully,

$$\begin{array}{l|r} 8 \cdot \mathrm{c},\ 5 \cdot \mathrm{m},\ \mathrm{d}\,4 \cdot,\ 1 \cdot \mathrm{m} & \mathrm{m}\ .\ 1,\ \cdot 6\,\mathrm{c},\ \cdot 7\,\mathrm{b} \\ \hline 6 \cdot \mathrm{c} & \cdot 6\,\mathrm{c} \end{array}$$

"In a large practice, where a division of work is necessary, the examining physician gives the patient that he sends to the extracting room a note with a printed formula, on which he has cancelled the symbols of the tooth to be extracted. To avoid any misunderstanding, an r (root) may be placed over or under the proscribed tooth if its crown be wanting."

PROPRIETARY AND MIXED ANESTHETICS.

There seems to be a tendency on the part of some practitioners of medicine and of dentistry to experiment with mixed anesthetics, or, worse still, with proprietary and secret compounds, highly indorsed by the secular press, by the reverend clergy, and by the editors of religious journals. These gentlemen write of the relative superiority and safety of a given compound as glibly as though their lives had been chiefly occupied in investigation of the various agents employed to produce anesthesia; and they mean apparently that their trumpets shall give forth no uncertain sound. Thus, one reverend gentleman assures the world that a certain preparation is "infinitely superior to all other anesthetics." While the rationale of the action of the various anesthetics upon the animal economy is still largely an unsettled problem to those of greatest

experience in their use, it would seem that "infinite superiority" could hardly be admitted on the testimony of a non-medical man. Stranger still, however, is the willingness of a professional man to accept the responsibilty of administering, for the production of general anesthesia, an agent of the composition of which he is not fully informed, and as to the peculiar action of which he is ignorant.

It is well known that the various anesthetics produce their effects upon the economy by entirely different methods, and that when signs of danger appear the remedies and treatment required differ accordingly. The procedure which in one case is the best is not only not indicated in another case, in which the unconsciousness has resulted from the employment of a different agent, but would be absolutely harmful and dangerous. How, then, in the presence of untoward symptoms following the inhalation of a mixed anesthetic, or of one the composition of which was unknown to the administrator, could intelligent relief be afforded? Chloroform, ether, and nitrous oxide are all for sale in the open market, and a pure article of either can be procured. Their properties, advantages and disadvantages, methods of action, modes of administration, the condition contraindicating the employment of one or the other, signs of danger, and procedure in threatened trouble all have been carefully studied, the facts reported, the theories deduced discussed, and some general conclusions, founded on the facts and the theories regarding them, have been widely accepted.

By almost common consent chloroform for minor operations has been discarded, because of the conviction that it is more dangerous to life than ether or nitrous oxide. Ether is seldom employed in the dental office, on account of its persistent odor, the length of time required for complete recovery from its effects, and the nausea which it frequently causes. Nitrous oxide has come to be used almost exclusively by the dentist, on account of the facility with which anesthesia is produced by it and the transient duration of its effects, but chiefly because for short operations it is deemed the safest of all anesthetic agents. That it or any other anesthetic is absolutely free from danger under all circumstances cannot be affirmed; but that pure nitrous oxide gas is the safest general anesthetic known is beyond controversy.

In view of the conceded fact that general anesthesia is not absolutely free from danger to life, such an interference with vital functions as is included in the condition brought about by any anesthetic should not be undertaken by anyone except by approved methods and with agents which have been the subject of the most searching investigation, and the rationale of whose action has been ascertained, at least to the extent which makes intelligent effort at resuscitation possible.

THE

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ORIGINAL COMMUNICATIONS.

THE EFFECTS OF PULPLESS TEETH REMAINING IN THE JAWS.*

BY A. W. HARLAN, M.D., D.D.S., CHICAGO, ILL.

The paper which I am about to read to you had been finished some days before I saw the Dental Cosmos for February, which contained an account of a previous meeting of this society, during which a discussion ensued on the subject of the "Effect of Pulpless Teeth when Left in the Jaws." Not having sufficient time at my disposal to rewrite that portion reviewing the various letters and editorials in the *Medical Record*, is my excuse for compelling you to listen to the brief extracts which find place in this essay.

From time to time the editor of a medical journal, or one of his occasional contributors, deems it necessary for his happiness to say something about the influence of dead (pulpless) teeth in the jaws being a prolific source of irritation to some portion of the human frame. Generally speaking the articles of both editor and contributor attract little or no attention. Of late, however, this has not been the fate of such contributions, and for proof of this statement you are referred to a series of letters which have recently appeared in the *Medical Record*, of New York. Before speaking of these letters particularly, it is necessary to go back a little and give you a résumé of what had previously appeared in the same journal, which has a bearing on what I am about to say with reference to the effects of retention of pulpless teeth in the jaws.

As long ago as May 5, 1883, Dr. Samuel Sexton, of New York,

* Dr. Harlan's paper was to have been read before the New York Odontological Society, at the February meeting, but a snow-blockade on the railroad prevented the author's attendance in time to present it. We print it in this number of the Dental Cosmos, which contains a report of that meeting, so that they may be read in connection.

published a paper on "Earache in Children," which I considered then, as I do now, a very instructive production, and in excellent taste. I fully agree with him in all his remarks on the subject of dental irritation standing in a causative relation to pain in the ears. One paragraph, however, is faulty in its conclusions, which is that "periostitis and alveolar abscess" may be the cause of pain in the ears. I deny this, and my reasons therefor will appear as I proceed. One week later Dr. Sexton had a communication in the *Medical Record* entitled, "Does the Retention of Dead Teeth in the Jaws Exert an Unfavorable Influence on the Health?" and answered it himself by stating that he did believe such teeth to be detrimental to health, even though they were filled, because "the presence of fillings in these cases is an effectual barrier to the natural escape of deleterious products, unless indeed alveolar abscesses form." Dr. Sexton's instruction or reading on dental subjects at that time must have been of the most elementary character. While he does not in the above letter advise the wholesale and indiscriminate extraction of pulpless teeth, he says: "I am quite sure that I have seen many recoveries in my aural practice quickly follow the removal of a defective tooth,"—*not* a pulpless tooth. He regards a pulpless tooth as in a certain sense a foreign body, and its "entire separation from the jaw is usually only a question of time." A few weeks later Sir Oracle himself speaks over the well known signature, X. His letter is entitled "The Influence of Dead Teeth upon the Health." He says: "The care of such teeth has formed a very large part of my practice for twenty-five years, and I feel competent to speak as to the feasibility of their being rendered in every instance, except where exostosis or malformation is present, quite as durable and innocuous as if their vitality had never become impaired." He laments that so few oral surgeons pay attention to this branch of practice (the treatment and filling of roots), and further laments (it really grieves him to say so) that there is not more "than one oral surgeon in a thousand does it (the filling of a root) with uniform success, and probably not two in a thousand at all." I hope this truly excellent and skillful oral surgeon still dwells in Gotham, as it would be a great pity that the metropolitan city of the New World should be deprived of the services of the "one oral surgeon" among the thousand resident here in Brooklyn, and part of "Jersey," who alone can fill "with uniform success the root of a tooth which is not exostosed or malformed." Sir Oracle, overcome almost by the thought that he of all dental surgeons in your vicinity wrestles successfully with root canals (in the filling of them), which "must invariably be done with metal," catches his breath long enough to say: "The proprietors or managers of dental depots

could doubtless, if they considered it best to do so, give the names of those who are qualified to fill a root." Such twaddle as the above is sincerely swallowed by our guileless medical friends, who preach texts to us about things of which they know little, which in turn are swallowed by our own innocent ducklings.

A little later, July 14, 1883, Dr. Frank Abbott, of New York, furnished a letter to the same journal, in which he agreed substantially with Dr. Sexton. It is not my purpose to review that letter entire. The author says: "In ninety-nine cases out of every hundred I should say they (pulpless teeth) do exert an unfavorable influence on health." If the doctor means by this statement teeth which have had their roots filled, then I dissent from his sweeping conclusions. I cannot agree with him when he states that septic matter from the decomposition of the organic portion of the enamel and dentine is absorbed by the living cementum after the filling of a carious cavity in a pulpless tooth, the root of which has been rendered aseptic and properly filled. Decomposition of the organic matrix does not take place under such conditions; it may occur when the filling is defective or the dentine is unprotected by it. I dissent from his statement that the pulp cannot be removed entire in more than one-half the cases where it is attempted, and believe that I will be supported in this disagreement by the majority of observant surgeons practicing dentistry. There are eight incisors, four cuspids, and four lower bicuspids which are provided with nearly straight roots. I conceive it possible for the skillful dentist to remove the pulp from the roots of all the teeth above enumerated. It is almost as practicable to perform the same operation in the upper bicuspids. Thus you may see that at least twenty of the thirty-two teeth are so situated, as to ease of access to the roots and physical conformation of the same, that their pulps can be removed. Of the twelve remaining molars, I think it possible in more than fifty per cent. to remove the whole of the pulp. I further believe that if its removal is attempted at the proper period after its death, —eight days thereafter—there are few teeth (less than five per cent.) from which it may not be wholly removed. The paragraph which states that "it is true that the tooth or teeth may not be painful, but some remote part, such as the eye or the ear, may be affected, or a neuralgia extending over the side of the face or head may be the result," is misleading to the accurate searcher for cause, and is not in accord with my observations. It is assumed that the proposition is true, that pain may be reflected to the eye, or the ear, or other portions of the body, when a tooth pulp is vital, and it is exposed or nearly so, from contact with external agencies,—cold, heat, pressure, its injury by a blow; the deposit of nodules of dentine in

its substance; abrasion of the tooth, or other injury—mechanical, chemical, or pathological; but to assert that pain is reflected from a perfectly filled root to remote parts, the tooth not being painful to purcussion, is to establish a new law in reflex action, which it is needless to remark is not founded on logic. We may and do have pain from the retention of noxious products in the pulp canal, or from their escape through the apical foramen, but it is mediate or diffused to the region of the tooth's habitation, until a sac is formed of such size that by impingement of a nerve we get a reflex pain. He would be a dullard indeed who could not diagnose the cause under such circumstances. A period of more than a year elapsed before the editor was provided with a text whereon he might playfully toy with the subject of dead teeth in the jaws. The publication of "Pain in the Ears due to Irritation in the Jaws," reported by W. A. Bartlett, M. D., from a series of cases in the aural service of Samuel Sexton, M. D., was the occasion of his plunging into the hitherto placid stream of neglect of his favorite diversion. The report of cases alluded to above undoubtedly disclosed this fact, that the majority of the teeth termed "dead" were simply carious, with living pulps; hence capable of producing reflex pain, but erroneously described as pulpless. Herein lies the offense. The surgeon in charge, "commenting on this subject, drew attention to the frequent attendance of females suffering from aural trouble through *sympathy of the nerves*, and the comparative infrequency of the complaint among men; even in children he thought the greater number of otalgias occurred among females. In reference to the treatment of these cases, it was believed that, since dentistry had become such a popular (!) business, and dead and diseased teeth had been so carefully retained in the jaws, through their influence, especially among the better-to-do, nervous diseases about the head were becoming alarmingly common. The very general custom of wearing false teeth in the mouth attached to vulcanite (?), rubber, celluloid, and other plates was an evil of vast proportions. Indeed, he sometimes thought that the evil done through ill-advised dentistry was greater than the possible good arising from the work of the more capable dentists." I wonder who encourages "the very general custom of wearing false teeth"? Is it the surgeon who advises extraction, or the one who carefully retains "dead," not diseased, teeth? I only use the above quotation because it nullifies itself. The picture is presented of a special teacher of practitioners of medicine first lamenting that so many dead and diseased teeth were *too* carefully retained in the jaws, to the detriment of the health of the patient, and afterwards asserting that the wearing of artificial substitutes was an "evil of vast proportions." The dentist who could

follow the advice of this very logical teacher would soon have a *clientèle* whose grinning ivories would never be seen by the public.

I am a believer in the acquisition of knowledge, but it does not always follow that the instructor instructs; hence I beg your indulgence a little longer to pay my compliments to the editor.

In the same number (October 4, 1884, page 379) may be found an editorial entitled "Dead Teeth in the Jaws." The editor says: "The clinical notes on aural disease in another part of the *Record* furnish additional evidence of the perils of tooth-saving." The speaker would say rather the perils of tooth-losing, as more teeth were ordered to be extracted than filled. I partially agree with the editor when he says: "A great deal of the nervousness with which some people are affected at the present day is attributable to the ill-advised retention of dead teeth, and the unskillful stopping of teeth when the pulp is sensitive, though not irreparably impaired by caries." But the undeserved fling at the intelligence, ability, and scholarship of the "individuals (dentists) whose limited knowledge of medicine does not prevent them from 'treating' dead teeth long after their presence in the jaws has given rise to alveolar abscesses, and neuralgias more or less painful," is, like the boomerang of its projector, more likely to prove dangerous to him who aims than the one aimed at. The editor has a vision—he becomes almost prophetic. He says: "It would not be strange if, in the course of events, the day would soon come when just the contrary practice would prevail; when all teeth without pulps, and hence in process of more or less rapid decay, as well as those which, from the deposit of tartar or other cause, had become entirely divested of periosteal nourishment, would be promptly condemned as unfit to remain in the jaws—regarded, in fact, as foreign bodies liable to give rise not only to cerebral irritation and disease in the organs of special sense, through the propagation of local disturbances in the mouth to the regions mentioned, but to endanger likewise the general health, through purulent matter discharged into the mouth from alveolar abscesses, to be continuously swallowed for a long time, or, indeed, in some instances, to be absorbed, and thus produce septicæmic poisoning." The fortunate manufacturer of artificial teeth would necessarily be the gainer in such an improbable event. The people are to be congratulated that the practice of dentistry is still to be conducted by one whose "medical training usually * * * is entirely too superficial to qualify him to treat disease, whether arising from the state of the teeth or not; in point of fact, his training does not always prevent harm being done to persons who are willing to have placed in the mouth some one or more of the numerous harmful dental appliances of the day." The happy thought that all

medical and surgical knowledge is centered in the truly medical man —the possession even of the minimum amount being denied us in the specially mechanical departments—must cause our only too human hearts to be torn with conflicting sentiments of admiration for the editor's profundity, and sorrow for the humble position to which dental surgery may aspire.

The appearance of the editorial just alluded to brought forth letters from Drs. J. Morgan Howe and C. E. Nelson, New York, and J. S. Marshall, Chicago. They were singularly lucid, and amply touched the several points involved in the retention of dead teeth in the jaws. While they dissented from the conclusion that pulpless teeth should be very generally extracted, they all agreed that medical men should *themselves* be better informed in dental anatomy, pathology, therapeutics, and surgery than they now were in these several branches. All of the letters here spoken of were couched in the kindest and most complimentary language, and the writers were polite enough to thank both editor and contributor for calling attention to the subject of pulpless teeth. A week later the present writer protested against the strictures of the editor on the intelligence, learning, and ability of dental surgeons, and at the same time analyzed the "cases" as reported by Dr. Bartlett, wherein it was shown that few if any pulpless teeth were responsible for the pain in the ears. A little later Dr. Sexton indited another letter to the *Record* on dead teeth in the jaws, fearful "lest silence might be construed as yielding assent to your correspondent's views." The author is not able to differentiate between symptoms of dental irritation, which are always local when teeth are pulpless and the roots have been filled, and pain that proceeds from pulp exposure, impingement, or the simple eruption of a tooth. He tries to show what was not intimated in "Pain in the Ears," etc., that "the extraction and filling of the teeth, where required, it may be said, is intrusted to our own dentists, who are competent to do such work." In other words, he seeks to divide the responsibility for extraction of teeth in the series of reported "cases" with "our own dentists." I have no disposition to treat Dr. Sexton unfairly, or to be captious or hypercritical, but when he deliberately sits down to answer his critics, and says "inflammation of exposed dentine cannot surely be entirely arrested in any case by filling the pulp-cavity with any known extraneous material," then I say his knowledge of diseases of the teeth is too superficial to entitle his views to command our serious attention. Dentine loses its capability of being inflamed or becoming sensitive after the death of the pulp. It will not be profitable to further discuss Dr. Sexton's views on the retention of pulpless teeth in the jaws. In the same number the editor discusses the

subject from the stand-point of agreement with his contributor, and hence no new light is shed on the matter for the enlightenment of the "mere mechanics who constitute by far the greater number of (dental) students." We find another article in the *Record* for November 22, but its discussion has no place here.

The number for December 13 closes the discussion on the part of the editor, who says: "We are in receipt of numerous communications on the above subject ('Dead Teeth in the Jaws'), mostly covering ground that has already been gone over." His opinion is unchanged, as witness his closing paragraph: "While instances of harm from retention of such defective teeth are so frequently occurring in practice, and persons with dental skill are unable to realize the mischief being done, the safer course is to advise that all dead teeth be removed, at least until such time arrives when medical specialists can determine with certainty that teeth are not the seat of any trouble that can possibly injure the patient."

It is hard to obey the sentence, but the dentists fall into line when the bugle sounds, and the clicking of the handles of the forceps must be heard all over the land until the last "dead tooth" has been plucked from its socket, or the "medical specialists (in embryo) can determine with certainty that teeth are not the seat of any trouble that can possibly injure the patient." The efforts of the pioneers who have departed hence; the study, inventive genius, and special knowledge of innumerable bright lights in the desire to save pulpless teeth for their owners, it seems, from this final decree, have proven valueless. For a similar case of misdirected and misapplied energy I know of no parallel. The delicate barbed broaches must be laid aside; the fine root-pluggers must be converted into exploring-needles; the attenuated gold and lead wires, the oxychlorides and phosphates, solutions of shellac, paraffin, gutta-percha, and other root-filling materials must be banished from our cases, and the manipulative dexterity so hardly earned in the preparation and filling of roots of teeth is no longer needed for the special labor which we erstwhile so delighted in! Gone from us the glory and satisfaction after the successful accomplishment of an operation which might have prevented an unsightly breach in the dental palisade! Are we to supinely sit and allow the temple to be overthrown while we yet inhabit it? I trust not. The thousands and hundreds of thousands of pulpless teeth, free from irritation or the possibility of reflecting it, retained in the mouth by the knowledge and skill of dental surgeons all over the civilized world, should stimulate us to make known the fact that he who wilfully or ignorantly sacrifices one such tooth without just reason is to be regarded as a Nihilist, and only to be welcomed back into the fold of good-fellowship after he shall have promised to sin no more.

The retention of pulpless teeth in the jaws is a *fixed fact which has come to stay.* The series of letters and editorials so largely quoted from, instead of diminishing the practice of retaining them, will cause medical practitioners to hesitate before ordering an otherwise useful member to be extracted. Efficient mastication of food is as essential to digestion as assimilation is essential to perfect nutrition. The natural teeth are infinitely superior for that purpose to any form of artificial substitute. It cannot be, nor is it intended to assert, that pulpless teeth with unfilled roots are not detrimental to health, on account of the purulent matters escaping from them to be swallowed. Exostoses, caries, and necrosis of the alveolar processes are among the well-understood reasons why such teeth are and must continue to be (unless restored to normality) deleterious to the health of the possessor; but the majority of pulpless teeth or roots which have antagonists, natural or artificial, are amenable to successful treatment. None are more capable of defending the affirmative of this proposition than the distinguished gentlemen whom it is my pleasure to address. The pain which may be reflected to the eye, ear, or other portion of the head or body, caused by a carious living tooth or the retarded eruption of a malformed tooth, is easily understood when it is remembered that the pulp is destitute of the tactile sense. Not so, however, when we have to deal with a pulpless unfilled tooth. In the latter we have the tactile sense of the peridental membrane augmented by the irritation at the apex of the root, which enables the careful diagnostician to locate the cause of the pain even before it has become diffused to any very considerable extent. It is certain that no pain will be felt in the eye, ear, or opposing jaw, unless there be exostosis of the root, or a cyst of large dimensions, or other mechanical cause, which will favor impingement of a branch of the adjacent dental nerve, whence the pain may be reflected. Such cases are rare. The effects of pulpless teeth remaining in the jaws, when the roots have been imperfectly filled or not filled at all, has been the theme of many surgeons not practicing dentistry, judging from the frequent reference to such effects in hospital and infirmary reports. The majority of such effusions are inexact, because the reporters, from lack of special knowledge, are unable to separate the cases of pain induced by living pulps from those in which the pain proceeds from their decomposition. Who among my listeners can point to a single half-dozen well authenticated cases of reflex nervous irritation relieved by the extraction of a filled pulpless root which was free from tenderness to pressure or percussion? I do not come before you with the weight of advanced years and a half century's experience in the practice of dentistry, but I come with the results of careful inquiry and more than a dozen years of experi-

ence and observation in the practice of retaining pulpless teeth in the jaws, to which should be added at least a respectable knowledge of the anatomy and pathology of the teeth, pericementum, and adjacent structures, and these combined have convinced me that all teeth or roots with antagonists may be rendered useful and free from irritation, when pulpless, by simple methods of treatment, either surgical or therapeutical. It is not only possible to fill the roots of at least ninety-five per cent. of such teeth, but when they have been filled to their apices the possessor is no more conscious of them than of other living teeth. That dental surgeons are as capable of exercising care, skill, and judgment in the treatment of putrescent pulps, alveolar abscesses, and other dental lesions, direct or reflex, as specialists in other branches of the medical sciences, none but the uninformed or narrow-minded would deny. That there are incapables and drones in this special field I do not controvert, but such examples of dead weights to the usefulness of the whole medical profession are not limited to the specialty of dental surgery. I would make the plea for dental surgery and her practitioners, that a necessity exists for its practice larger than that of any other specialty in the domain of medicine; and for the latter, that they are ceaseless and tireless workers for a scientific basis on which to found their practice.

PYORRHEA ALVEOLARIS.

BY A. O. RAWLS, D.D.S., LEXINGTON, KY.

[Read before the Southern Dental Association, at New Orleans, March 31, 1885.]

A QUESTION is not to be questioned when all agree; but many dissenters may quickly evolve the truth. A brief review of the opinions of others relating more especially to doubtful points in connection with pyorrhea alveolaris, will probably assist our researches and better enable us to sift the facts from the tangled mass of diverse expression.

When this disease, as distinct from other inflammatory lesions of the oral cavity, was first brought prominently before the dental profession, hundreds of practitioners had observed as its probable cause a deposition of salivary calculus, and naturally enough they concluded that its origin was strictly local. But from the time when Dr. Rehwinkel, of Chillicothe, and myself saw fit to oppose this view of its causation, at a meeting of the American Dental Association in Chicago, opinion has very materially changed, and to-day finds the advocates of local and systemic causation pretty evenly balanced. The local-cause theorists are at variance as to the cause, some claiming salivary calculus as its origin; a limited number sanguinary

calculus, and still others that the affection is resultant from a "peculiar organism of fungous growth which always fills the pockets."

To Dr. Riggs, of Hartford, is justly due, I think, the impulse to investigation in this matter, and I look upon him as the pioneer of the local-origin theory. If I am not misinformed, Dr. Riggs claims that salivary calculus is the immediate cause, and his treatment, so far as I have been able to learn, is certainly consistent with such view, besides being, in my estimation, far superior to the local treatment of other theorists. Dr. Ingersoll, of Iowa, advocates the theory of sanguinary calculus as a cause, stating that often when no salivary deposits were present the sanguinary calculus would be found far up the roots of teeth,—which I think correct, but would prefer the term serumal calculus. Dr. Black, of Illinois, presents the latest local-origin theory, in support of which, and confirmatory of his microscopic investigations, he has the results of similar research by Dr. Witzel, of Essen, Germany, whose article bearing upon the subject was somewhat earlier than that of Dr. Black's. This is one of the numerous germ theories, and is founded upon the fact of the presence in these cases of little hot-beds of peculiar organisms of fungi, which, according to supporters of the theory, cause a melting away of the pericemental membrane—by what means is not definitely understood, but presumably by the "digestive fluids of the fungous growth causing a re-molecularization of tissues exposed to their action."

As I understand it, the characteristic symptoms and signs of this much-dreaded malady vary somewhat in their nature. The progress of the disease differs also in accordance with formation of the parts, habits of the patient, environment, nature of cause, and whether the latter be hereditary or acquired. The incipient symptoms are by the casual observer seldom noticed as such, simply for the reason that they are in their expression somewhat analogous to those occurring in pericementitis or submucous irritation from ordinary causes. Dr. Black says the disease is first rendered apparent by a red line at the border of the gum, and asserts his belief in this as a constant first symptom. Now, while this may be true as it refers to occasional first apparent signs, it is, according to my observation, no part of the truth as it refers to first symptoms. First symptoms are not seen; they are felt. About the earliest subjective symptoms are either a sense of fullness or a feeling of impactedness in the vicinity of the teeth involved. That there should be a variation in incipient symptoms in different cases or in different localities in the same mouth, is probably on account of difference in the shape of the teeth, the direction of contact, and point of initial lesion. The above symptoms are usually followed by more or less soreness and a

springy feeling under delicate percussion, the soreness gradually lessening as the disease progresses until the lesions become so extensive as to admit the action of deposited irritants, when it returns and abates alternately, as the parts are relieved by cleansing and depletion or congested by close contact with irritating deposits. Following these primary symptoms come the more pronounced (though difficult of detection) objective symptoms and signs. The first of these is not "a red line at the border of the gum," but a slight prominence or thickening at that point, with no perceptible change in color from that normal to the part. In not a few cases the foregoing manifestations are successively present, and yet no deposits of a calcareous character are to be seen or felt, and occasionally not even a disruption of the tissues at the neck of the tooth or teeth thus implicated. At this stage of the disease the "red line" may follow, though generally not until there has been present a slightly bluish or purplish tint, which is indicative of increased size of the capillaries, congestion, and carbonization of the blood at the point referred to. This color passes away with disruption of tissues implicated, and is gradually replaced by a more angry-looking red line, though not always; especially is it not so when the lesion exists between the teeth. Following these symptoms and signs, the dissolution of continuity goes on between gum and tooth, the objective symptoms become much more marked with the influx or deposit of additional irritants, and in turn the periosteum at the margin of the process or over the septa between the teeth is laid bare and subjected to the exciting causes of dissolution which had induced its exposure. The destruction of the peridentium advances toward the apex of the root; the pericementum melts away; there is a break in the round of nutrient circulation that had once supplied the alveolar border, and the work of disintegration proceeds in the wake of decreasing nutrition. Shortly after the process begins to soften the external indications will vary in different cases. There may exist a dark turgidity of the gum, or simply a more or less bluish-red line, showing the depth and direction of the dissolution, —this latter only when the attack is on the posterior or anterior surface of the root. Again, neither of the foregoing signs may be present—nothing but a slightly-raised, thickened, and loosened condition of the gum at its margin to indicate anything wrong. In such a case, especially if but little pus can be pressed out, it is usually indicative of greater integrity of tissue, and if occurring in cases of heredity, records a decline in the system of the remote cause or predisposition.

The points which are usually first attacked are those which it might naturally be expected would be affected, viz., where there

exists the greatest amount of gum-tissue with the least of external contact or exercise, and about the openings of the ducts of the several salivary glands. This, it is true, gives color, more or less, to the local-cause theory. Other points of attack are such as may result from peculiarly-shaped or irregularly-placed teeth in different parts of either or both maxillæ, such as molars or bicuspids that have pressed forward or been pushed backward out of position; broad, square-crowned molars and bicuspids, with very narrow necks, showing depressions, either longitudinal or transverse; lateral incisors standing in from the line of arch which the position of the cuspids would indicate; broad-cutting edges and narrow necks of the incisors; the twisting or malposition of any one or number of the teeth which would favor the existence of an area of soft tissue comparatively unexercised, either by the act of mastication, by the tongue, the muscles of contiguous parts, or efforts at cleansing.

As previously stated, the progress of this disease varies according to formation of parts, habits of the patient, environment, nature of cause, and whether the latter be inherited or acquired. We have just observed how much the formation of parts affects their susceptibility to initial lesions; so, in like manner does it influence, more or less, the direction of destruction, as well as the rapidity with which it takes place. In cases where the alveolar ridge is thin from posterior to anterior surface, the progress of the disease is likely to be continuous in one direction, viz., from the point where the process is first denuded of its membrane directly toward the apex of the root. Although the attack in such cases occasionally takes place on the anterior or posterior margins of the border, it is of more frequent occurrence upon the septum between the teeth, often giving evidence of little or no breaking down of the septum, but destroying the pericementum in a straight line toward the end of the root. Should the septum also be very thin between the teeth involved, and especially if this condition be present nearly the length of the root, it would be comparatively tenacious of life and slow to give way,—this arising probably from the fact of its greater density as compared with a thicker septum, and, if the disease attacked but one side, from its close association with anastomosing nutrient currents of the adjoining tooth. Upon the other hand, should the process be heavy, square, thick, and of considerable depth, a different action may be looked for, in this, that the progress of disorganization will be slower in a direct line toward the end of the root, and much more rapid upon the entire superficial area of the intervening septum; but while the latter is succumbing to the disease, the anterior or posterior plates of the process will remain standing for a much longer period of time. The gums in such instances,

especially if the patient be ordinarily cleanly about his teeth, will, particularly in the vicinity of the molars, bicuspids, and superior incisors, drop in over the borders of the posterior and anterior alveolar plates, thus presenting a flattened or somewhat squared aspect, with open depressions between the teeth. Again, in case the alveolar ridge is of extraordinary width, and at the same time of but little depth, the destruction of bone proceeds in about the same manner as in the foregoing case; but if it proceeds from the septum, it compromises much more readily the anterior and posterior attachments of the teeth, and *vice versa*, if proceeding from the latter points. Instead, however, of the gum becoming depressed between the teeth, as in the foregoing instance, which similar thickness of the process would lead us to expect, it seems to fill up the space caused by disintegration of the underlying bone, and still retains about the same relative position to the necks of the teeth as in health, and yet presents a more generally inflamed appearance. You will observe, so far as the process is concerned, that in all the above cases the principal action of the disease is upon the more spongy, consequently less resisting, structure between the anterior and posterior plates of the process. When beginning on the process between the teeth, the wasting away continues in the various ways mentioned until the outer plates are reached, which latter have thus far, under the nutrient supply of tissues external and still intact, held their own, but must now, with the advance of the enemy upon the territory of their life-current, go the way of the less resistive tissue they once inclosed and were a part of.

That daily conduct or habit of the patient has much to do with influencing the progress of this disease is certainly patent to all who have any knowledge whatever of its characteristics, and although effects thus arising may be scarcely noticeable in their bearings upon the predisposition, they evidently must, according to all physiological law, prevail. The effects of habit, however, to increase or lessen the amount and impress of local irritants are readily seen. Irritants of any nature tend to increase the demolition of parts, especially those denied the protection of their natural covering. Hence scrupulous care in freeing and keeping free such parts of substances so acting will retard in a degree the destruction that would otherwise ensue. Again, if patients are accustomed to wholesome outdoor exercise, such as more frequently induces the desire for good, substantial food, consequently insuring abundant and vigorous exercise of the jaws and teeth, the disease will progress much slower than if, on the other hand, they subject themselves to close confinement indoors and live almost entirely upon soft, pultaceous diet. As an evidence that the exercise of the parts involved is an

important factor in the management of the malady, witness the difference between cases where tobacco is constantly chewed and those where it is not, or the difference in the progress of the disease about the teeth in the same mouth, it *always* being slower on the side most in use. Possibly the narcotic properties of tobacco may to some degree lessen the intensity of the trouble, but I apprehend the differences apparent are due more to the mechanical effects in exercising and cleansing the teeth of food, rather than to any therapeutic action of the tobacco *per se*.

To express to you the opinion that environment is responsible for much in connection with this condition may seem like going beyond the legitimate pale of inquiry. Nevertheless, if my observations go for anything, environment has in a degree laid the foundation for the disease in question. It has caused conditions which have in some manner led to the employment of mercury to ptyalism by thousands of our people. In the early settlement of each State, as the "star of empire westward took its way," so indeed did the blight of mercury hold its sway, and the children of these people, whose principal remedial agents for almost every hidden or serious ailment were antimony, mercury, and blood-letting, are to-day, under the absolute laws of heredity, more or less victims of parental environment. Again, it may appear strange to you that chloride of sodium, an article of seasoning, will, under certain to me unknown conditions of the system, produce similar if not identical symptoms in the oral cavity as may be found resulting from the use of mercury. You ask, What has this to do with environment? Well, go and make inquiry of the people who dwell midst the swamps and marshy lowlands of malarious districts; question and notice those who are subjects of malarial poison, and learn for yourself their extraordinary craving for salt, and then observe the results upon the oral tissues. Should you conclude that other influences, such as the presence of miasmatic germs afloat in the atmosphere, have caused the lesions you will find in many mouths, then I ask you to investigate the case of the common sailor of the high seas, whose diet consists largely of salt meats, and you may be satisfied that salt is a factor in the production of this disease. If still in doubt, extend your researches to the common Irish laborer on our public works, who has been in this country for several years, and find there the effects of a long use of briny meats. Not only does it seem to me that malarious districts are among the favorite places to note the inception of this scourge, but the very atmosphere of the surroundings is abundantly fruitful of germ-life, and the gaping wounds or lesions of any character, whether pyorrhea alveolaris or otherwise, will not be the less gaping for their influx, to say nothing of their off-

spring, in such a habitat as would be their lot in not a few mouths.

Generally speaking, the acquired conditions resulting either from the use of mercury or salt are slow to manifest themselves. The effects of the former may indeed quickly produce ptyalism, but the objective symptoms of the latter soon pass away, especially if the patient be of vigorous constitution, and there may be no signs characteristic of the disease for several years; but as time creeps on gradually the signs become apparent, and by the time a number of years, varying, according to unknown influences, from ten to thirty, have passed, the work of destruction has begun, and so continue, until the teeth loosen and are beyond redemption.

The majority of cases of which I now speak you will find among people who have passed the meridian of life, and on up to old age; seldom, if ever, in youth or early manhood. How often do you hear the children of these afflicted ones say, "Why, father is sixty-five years of age and hasn't a decayed tooth in his mouth," and then reflectively adding, "but his teeth are awfully loose." Indeed, the children are right; for decay seldom if ever takes place in the teeth of persons so affected, and if perchance it existed before these conditions were acquired, it seemed to have stopped right there and remained in *statu quo* through life. But mark you the difference. Under the laws of heredity these conditions of the parent are transmitted to the offspring, and the signs and symptoms are apparent in childhood and youth instead of old age. If, however, a child is born to these parents before the conditions are acquired, no indications of the disease will be present; but, on the other hand, and as sure as laws of heredity obtain to mark the features or the color of the eyes and hair, so certainly will the younger children get the effects in the receipt of the self-same conditions more than do the elder ones. When inherited and in the first transmission, the disease is much more difficult of control; the tissues of the parts are apparently of less integrity, melting rapidly away, and the attack is usually more precipitous, uniform, and general throughout the mouth, though the gums of young patients retain their position comparatively well about the necks of the teeth long after the cancellous bony structure of the process has wasted away. The varying progress of the manifestations arising from the two different causes I believe to be noticeable. True, however, I have not met with and studied a sufficient number of cases attributable to each cause to be quite so well founded in my belief upon this point as to admit no doubt, but such experience as I have had leads me to the conclusion that the disease growing out of a transmitted mercurial taint progresses with greater rapidity than if occurring from the use of chloride of sodium.

And now concerning the treatment. First, allow me to remind you that from time to time you have heard what some have been pleased to call my mere assertion to the effect that pyorrhea alveolaris could not be cured by the removal of calcareous deposits or local treatment unaided. Indeed, you may have heard me deny the possibility of a cure when the case was well developed and typically marked as such; but before proceeding further let me say that from my stand-point there is a vast difference between typical and non-typical cases. To me a typical case is one in which mercury in some shape or chloride of sodium has been a causation of conditions which have rendered possible the local manifestations, regardless of tartar, fungus, or other external irritants,—conditions which have their place of local manifestation the same as other predispositions, and which may grow into dyscrasia and bloom out into local symptoms and signs in accordance with the character of the parts predisposed. Granting you that some of these cases in their earliest stages, before much bony tissue has been involved, and especially when the disease has been acquired, or, upon the other hand, exists in the second or third generation from its origin, can be checked or cured for a time, we will proceed with remedies.

Within the past decade dental societies have every month discussed the different wonderful specifics for "Riggs's disease," and our dental journals have regularly fed the hungry masses with allopathic doses of each and every new one. All kinds of powerful antiseptics have been on trial; germicides, parasiticides, escharotics, caustics, etc., are still in wholesale use. These may be of service in their time and place, but after all is said and done there is but one principle upon which all local—*local* I say—treatment should be based, viz., that new tissue will not grow upon dead tissue. In other words, broken nutrient continuity must have protection against substances inimical to the establishment of embryonic tissue.

Of the cases coming under the care of dentists the majority have passed the primary stage, and the alveolar process has been more or less involved in the gradually advancing destruction. Under these circumstances, the first thing to be accomplished is the most thorough removal of all deposits of a foreign nature from about the necks, crowns, and roots of the teeth to the process. To do this completely and to assist in the operation which follows it often becomes necessary, in order to secure room for the entrance and exit of instruments, to incise or split the gum slightly over or in the vicinity of the parts to be operated upon. Especially is this required when the lesion exists between the teeth, and the septum is much broken down, for the chances are that the bone here will not be reproduced, and, by splitting the gum from external to internal aspect, you are

not only enabled to work with more ease and certainty, but when the work is completed the gum will more readily drop in over the parts operated upon, thus shielding against foreign substances what re-formation of tissue may take place. During this operation it is well from time to time to syringe well the parts with tepid salt water, mixed with which may be any one of the many good antiseptics now in common use. About as good a preparation as you will find for this purpose is Listerine, which combines the qualities of an antiseptic with that of a stimulant and does not perceptibly coagulate albumen. When reasonably assured that the teeth are well cleansed, your attention should next be directed to the removal of all disintegrating and lifeless bone. How easy to say and yet how seldom accomplished! Indeed, this is often a very difficult and painful operation, not only to perform but doubly so to ascertain when it is complete. Months, even years, of experience, a steady hand, delicate sense of touch, a cool head, and a thorough knowledge of the parts are required. Aside from this, you must be able to tell by the touch of an instrument the difference between the dead and living process.

There are but few instruments made that are well adapted for use in this operation. The ordinary scaler, while suited to the removal of calcareous deposits from about the teeth, is by no means of good form for the removal of dead bone. Six or seven different instruments will be sufficient. Of these, two should have scoop points of different sizes, two right and left curved chisel points, two sickle-shaped blades, and one should be a small, slightly curved sounding instrument.

As in the preliminary operation, the use of the syringe may occasionally be continued after the removal of all lifeless bone, and sometimes before it; teeth much loosened from their sockets should be ligated with waxed silk to their fellow teeth. Following this operation, an antiseptic in solution with tepid water may be thoroughly used about the teeth; but as for the use of strong escharotics, caustics, and such like preparations, especially on pledgets of lint or cotton to be left in the pockets for hours at a time, I think it entirely contrary to our best conceptions of the laws governing the reproduction of tissue. If the operation has been complete, and the parts freed by syringing and by the flow of blood from the débris resultant therefrom, then all has been done that can be of any avail so far as you are concerned. Other duties devolve upon the patient. On the other hand, should the operation not be complete, all the caustics, escharotics, antiseptics, germicides, and parasiticides known to ancient or modern times, in full strength, in solution, in crystals, in granules, amorphous or otherwise, on cotton, lint, or silk, will be of

as little use as an attempt to have the surgeon's flap unite over a necrosed bone. What is needed after the operation is protection of the parts, and to my mind nature's own protection—a clot of blood —is far superior to anything else.

The patient, as previously stated, now has his duties to perform. He should be instructed to keep the teeth scrupulously free of food, to gently manipulate the parts by rubbing and pressing the gums with thumb and finger, using the pressure inward towards the parts from whence bone has been removed, and after the soreness following the work has passed away to use some kind of chewing-gum, that the teeth and contiguous parts may be kept in gentle exercise.

In conclusion, allow me to present a few questions, still at issue, which deserve investigation if we desire a correct knowledge of the etiology of the ailment.

First, do all persons who have deposits of salivary calculus about their teeth present the true characteristic signs and symptoms of this disease? If not, why?

Second, is the disease infectious? If so, why have so many of the human family escaped its ravages through centuries of contact and exposure to its action; and why are not dentists, who daily and hourly stand almost mouth to mouth with patients, all so infected? Of course we expect the reply, from those who hold to the theory of infection, that all persons are not alike susceptible to the action of forces, and that, as with all infectious disease, one may be affected, and others, equally subject to the same producing causes, show no signs of infection,—the difference resulting from a different systemic condition. Very well; so far so good.

Third, is the fact that this disease runs in families more an evidence of its infectious character than of its heredity?

Fourth, is it true that a peculiar and distinctive fungus finds its habitat in the lesions of this malady, and cannot be found in mouths not so affected?

DENTAL REGULATING APPARATUS.

BY EUGENE S. TALBOT, M.D., D.D.S., CHICAGO, ILL.

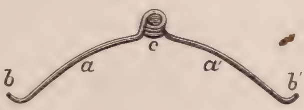
In many of the operations designed for the regulation of teeth, one of the first and most difficult things to be done is the spreading of one or both of the dental arches, and usually much time is consumed in efforts to obtain a fixed point from which movements may be made. The jack-screw is a positive and simple device, but it cannot be used from side to side of the inferior maxilla because of the intervening tongue; it also interferes greatly with vocal articulation, if so adjusted as to span the palatine arch, and as the majority of cases to be regulated are those of children in attendance at school,

they must thus be either kept out of school or be subject to great annoyance from the jack-screw impediment.

The Coffin cleft plate is an improvement in comparison with the jack-screw, but likewise interferes with the tongue if used on the inferior maxilla; and when applied to the superior maxilla the complex character of the spring makes the fixture difficult to adjust in such relations that the expanding force shall be exerted in directly

FIG. 1.

FIG. 2.



opposite directions, the spring having usually a tendency to thrust the plate out from the mouth; and, in cases where the teeth are not fully erupted, it is extremely difficult to retain such plates in position.

An appliance by which I have obtained the most satisfactory results, with a minimum of hindrance or discomfort to the patient, will be described with reference to the accompanying illustrations.

FIG. 3.

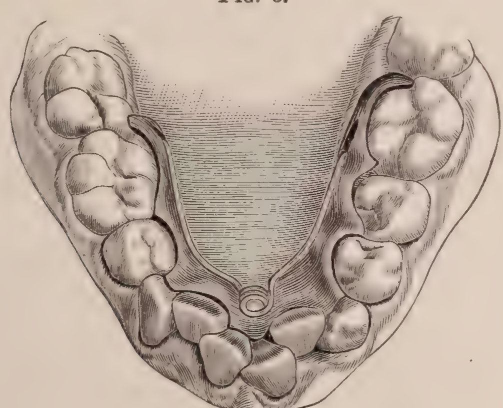


Figure 1 shows a spring made of piano-wire, coiled three times around a mandrel of the same or a little larger wire, and then bent down so that the arms, *a*, *a′*, will be in the same horizontal plane as shown at *c*. Figure 2 is a view of a like smaller spring having each arm-end, *b*, *b′*, bent at a right angle in the same plane.

On an exact plaster model of the case to be regulated a thin, narrow vulcanite plate is formed, with a short vertical post fixed, either before vulcanizing or afterward by drilling, centrally in the plate on the median line. Grooves or slots are, with a wheel bur, cut in the sides of the plate to receive the ends of the spring and prevent its displacement after the coil has been placed on the post. Figure 3 represents such an appliance in position on a plaster cast of the inferior maxilla of a boy aged twelve years, and it will be thus seen that the movements of the tongue would not be, as in practice they were not, seriously restricted. For the superior maxilla the plate is of like construction, and in some instances may be ligated to the teeth. The tension of the spring is changed by simply bending outward or inward its arms, and in many cases the apparatus may be inserted or removed with great facility, and its action be so continued and controlled that the required expansion may be obtained and maintained by the use of but one plate. In occasional instances the plate may be dispensed with, and by the judicious use of ligatures the spring-arm may be attached directly to the teeth to be moved, while the coil is likewise fastened to the front teeth.

ROTATING APPARATUS FOR REGULATING TEETH.

BY J. N. FARRAR, M.D., D.D.S., NEW YORK, N. Y.

No. XXV.

(Continued from page 7.)

Favorable responses through the mail are always encouraging to an author. Were it not so, probably the pen of the writer would have long since dried.

Two motives, and only two, have led to this series of papers. First, to explain the writer's method of doing things, in order to induce others to try it, for their own as well as for their patients' good, in lessening pain; second, to do what he can to elevate the science. In order to correct an erroneous impression, somewhat current, he begs further to state that he does not make and never has manufactured regulating devices for the profession, and in no way has he ever been associated with others in so doing. Those who have skill enough to properly manufacture their own appliances will best understand the road to success. In truth, it may be said that only those gifted by nature for the work should attempt it.

Cone-Lever Rotator.

A little device which the author has sometimes found useful when but slight rotation is necessary is illustrated by Fig. 157.

A gold clamp-band, B (Fig. 157), has a collar soldered on one end, and a nut, N,″ soldered on the other end. A screw, L, passes through the collar and screws into the nut, N″, while another nut, N′, is turned on the screw against the collar nut, and thus clamps the band on the tooth (see Fig. 158). Upon the long arm of the screw, which thus serves as a lever, a smooth coned collar, C, is placed, and a nut, N, adjusts the coned collar from behind, which rests between some

Fig. 157.

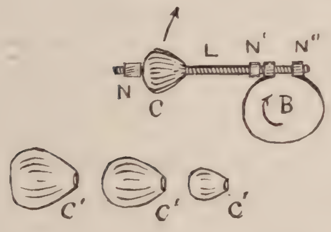
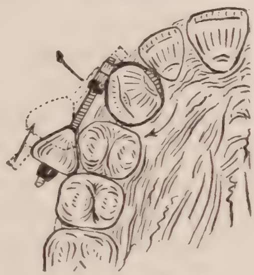


Fig. 158.



adjacent teeth,—as, for example, between the bicuspids, shown in Fig. 158. It is obvious that in turning forward the nut, N, the coned collar, C, will be forced to slide as a wedge over the first bicuspid, and thus cause the lever to rotate the tooth clamped by the band, B.

To avoid too frequent readjusting (back) of the apparatus, larger sizes of cone-balls, C′ C′ (Fig. 157), are recommended to be used.

PROCEEDINGS OF DENTAL SOCIETIES.

SOUTHERN DENTAL ASSOCIATION—SEVENTEENTH ANNUAL SESSION.

The seventeenth annual session of the Southern Dental Association was held in Tulane Hall, New Orleans, commencing Tuesday, March 31, 1885.

First Day—*Morning Session.*

The association was called to order at 10.30 A. M., the president, Dr. A. O. Rawls, in the chair.

Routine business occupied nearly all the time of the session. President Rawls, in lieu of the usual annual address, read a paper on "Pyorrhea Alveolaris."*

Adjourned to 2 P. M.

* This paper will be found at page 265, current number Dental Cosmos.

Afternoon Session.

Dr. W. C. Wardlaw, of Augusta, Ga., from the Committee on Dental Hygiene, read two papers, the first written by himself, the second by Dr. B. F. Arrington, of Goldsboro, N. C. Following is a synopsis of Dr. Wardlaw's paper:

After referring briefly to the laws of general hygiene, the essayist passed on to the consideration of the special principles applicable to the preservation of the health of the teeth and associate parts. He did not look for much good from the formulation of rules for the choice of husbands and wives, so long as men are governed in this matter by their natural desires and passions. It is well enough to say that the mother during gestation should have pure air, proper exercise, nutritious food, regular habits, a cheerful disposition, and pleasing surroundings generally, in order that her child may develop well and have good teeth; but how many mothers, after acquiescing in your suggestions, are going to follow your injunctions? Personal comfort, strength of appetite, the requirements of fashion, and the force of situation will prove more potent than principles of science. We must have something more tangible. Our practical results must be had after birth. We may effect something with the individual, though we can do but little for the unborn posterity. The first principle in this direction is the great law of cleanliness. Cleanliness is not merely "akin to godliness," but is essential to the preservation of the teeth. A tooth kept absolutely clean will not decay, whether from acids or "bugs." Tell the young mother this; tell her that the mouth is a kind of cesspool; that the mucous membrane of the gums, tongue, and mouth is undergoing exfoliation; is throwing off epithelial scales which readily decompose; that the saliva is often in a vitiated state; that capillary attraction and the shapes and positions of the teeth retain these animal matters, with other foreign substances, as particles of food, etc., upon and about them until they ferment and are thus made potent to cause decay. Impress her mind fully with these facts, and you have laid the foundation of a "hygienic law" more practical than all your fine-spun theories as to phosphate foods, bolted flour, etc. Let the mother begin, when the "first tooth" makes its appearance, to rub the tooth and gums with a soft cloth, not once, but several times daily. The habit once formed with her becomes an easy practice, and as the mouth fills up with tooth after tooth, they are in their tender days defended from the presence of their great enemy. The child thus early learns to know nothing else than to keep its teeth clean. As it grows older and comes to appreciate its importance more, assisted by self-respect and personal pride, it will give

the matter increased attention. In the meantime look to the general system, and build up a vigorous constitution. Recommend oatmeal porridge, brown bread, Graham's flour, lacto-phosphates, limewater, juicy meats, etc. These organic substances, being nutritious and easily assimilated, go toward invigorating the entire system, including, of course, the teeth. The inorganic elements, given in the popular form to the mother to furnish bone material to the babe "in utero," he does not believe of any moment. They must first be prepared for assimilation by passing through a proper vegetable or animal laboratory. They may probably have a tonic effect, and thus assist digestion and nutrition. The ordinary food, animal or vegetable, taken by the mother contains a sufficient supply of these elements to furnish all the bone- and tooth-material needed by herself and babe, if her organs are in the normal condition for appropriating them.

The next prophylactic measure is "cleaning" the teeth, "brushing" being the usual mode. This should be done regularly, frequently, carefully, intelligently. A moderately stiff brush should be used, and the effort should be made to reach every surface of every tooth. A vertical motion, carrying the hairs between the teeth, is better than the horizontal, which cleanses the prominent points only. By partially closing the mouth after inserting the brush, the buccal surfaces of the molars can be best reached. Very few persons even attempt to brush within the arches, and they totally neglect the lingual surfaces of the lower incisors, the favorite locality of tartar. The teeth should be brushed at least twice daily; but if it is done but once, let it be night or morning as it can be done most conveniently and thoroughly. In conjunction with the brush should be used the tooth-pick and, by ladies who object to the pick, the silk thread. The thin, pliable, delicate quill pick is the only proper one. The national soft-wood hotel pick is ineffective, destructive, and abominable. The writer believes the wood pick to be a fruitful cause of Riggs's disease. It is too thick and soft to penetrate narrow spaces, but when partially inserted the pressure upon the gums is rather grateful, and the tendency is to prolong and increase it. Undue violence is thus used, which breaks up the ligamentous attachments of gum and tooth, leaving a receptacle for food and tartar.

A dentifrice to go with the brushing should be decidedly antacid, to neutralize the acidity of the saliva and correct the fermentation of foreign substances. It should contain nothing gritty or insoluble to irritate the gum festoons. Tooth pastes and tooth soaps he objects to because they prevent the desired friction of the brush by lubricating the teeth and because they are but slowly soluble

Mouth-washes are useful or deleterious, according as they are compounded for special cases.

Another important hygienic consideration is the chewing of solid food, such as rare meat and well-cooked corn-bread. This affords a healthful exercise, bringing into functional activity muscles, glands, blood-vessels, etc., which promote growth and development of the teeth, jaws, and associate parts. An excess of soft-boiled food is in like manner contra-indicated. The use of chewing-gum is beneficial in a similar way, and in addition cleanses the teeth through the friction, and dilutes acidity by the increased flow of saliva. The habit of tobacco-chewing is not opposed to dental hygiene, though it may be to general hygiene. The nicotine seems to diminish sensitiveness, to neutralize acidity, to harden dentine, and to retard caries. An excess of animal food, as salt pork, having a tendency to induce scorbutic affections, is to be carefully guarded against.

Dr. Arrington's paper was, in brief, as follows:

Constitutional treatment and special diet with a view to effecting a radical change for the better in the dental structure several generations hence is absurd and impracticable. The practice requisite could not be enforced in this age, and, even if practical and easy of accomplishment, the result would be questionable, the conglomerate mixture of the American population rightly considered. To contend with disease as we find it in the teeth and soft tissues of the mouth is our field of action, and our duty is plain. With children to the age of nine or ten years, observation and careful inspection of the mouth should be frequent; treatment generally temporizing,—never over-anxious to do too much, but the little that is done should be done gently and well. Let it be a sort of educational process for future action of a permanent and durable character. Treat decay and fill teeth as judgment directs, never waiting, if possible to avoid it, until the decay is far advanced. In deciding as to the material for filling cavities, *discard all prejudice.* Several things are to be taken into consideration,—age, temperament, locality of cavity, texture of tooth-structure, etc. Invariably remove from the mouth all calcareous and other foreign matter, all teeth and roots of teeth that cannot by reasonable treatment be made comfortable and useful. Extraction and the removal of tartar are often the best service a dentist can render a patient. As regards disease and treatment of gums, the writer had for more than ten years past used but one remedy for medicinal effect,—*sulphuric acid;* mildly or heroically, as conditions indicate; and so with any disease strictly pertaining to the dental structure; and he always looked for and realized satisfactory results. There is no remedy better than

sulphuric acid for diseased gums, chronic or acute, and for diseased bone nothing equals it. The above treatment, when requisite, with daily use of a rightly-shaped tooth-brush, of small dimensions, from early childhood to old age, will be all that is necessary for the preservation of a healthy mouth in a large majority of cases. Constitutional treatment for months, with the additional innumerable local applications, mountain air, sea voyages, etc. (sometimes advised), for the cure of diseased gums, is absurd, and should not be tolerated.

Dr. B. H. Catching, Atlanta, thought the ideas embodied in Dr. Wardlaw's paper ought to be impressed upon the people. With regard to dentifrices, dentists should discard all secret preparations intended for use in cleansing the teeth. They have no more right to order such dentifrices for patients than physicians would have to prescribe Mrs. Winslow's Soothing Syrup. He agreed with the writer of the paper that the use of soap as a dentifrice was of no avail, because there is no friction.

Dr. J. R. Walker, New Orleans, thought the stiff tooth-brush a crying evil. It tears away the gum from around the necks of the teeth; it fails to take away the particles of food from the interstices, and, in many instances, causes pyorrhea. He agreed with ideas expressed about the wood tooth-pick; it is a delusion and a snare.

Dr. C. W. Spalding, St. Louis. Dental hygiene is a very important subject, chiefly because there is so much neglect of children's teeth. There is a wide-spread impression that the first set are soon to be replaced by the permanent teeth, and they are consequently allowed to take care of themselves. This impression should be removed and efforts made to secure early the proper cleansing of the teeth. In his own view the gums require friction as well as the teeth, and thorough cleansing. If a stiff brush can be properly made, it can be used with good results. In the usual forms the bristles are too close. We have got to remodel our tooth-brushes, and as well our way of using them. The best way to brush the teeth is to place the point of the bristles on the gum and move towards the ends of the teeth. This method comes easy with a little practice. With regard to secret preparations, he agrees with the idea that no dentist is justified in prescribing any preparation the formula of which he does not know. The object in using a dentifrice is to increase the friction, and if the teeth can be kept clean without it, a dentifrice is of no value. The idea of using soap for this purpose is simply absurd, for it defeats the very object which it is desirable to obtain, by decreasing the friction. As to washes, it is impossible to compound them so as to be of use in cleansing the

teeth without their also having medicinal effects upon the gum. He has almost laid aside local applications in the treatment of diseases of the teeth, except in pyorrhea alveolaris at first. He insists that measures for securing dental hygiene should commence early in life. If the habit of keeping the teeth clean is then formed it will continue through life; if not formed until adult life, it is very questionable if the cleansing will be regularly attended to.

Dr. W. H. Morgan, Nashville, Tenn., has failed to obtain the same results with sulphuric acid as are claimed to have occurred in Dr. Arrington's practice. In the speaker's hands it has not been an effective remedy; it has been a failure. The paper started out on the theory that if the teeth are kept in absolute cleanliness there will be no decay. He (Dr. Morgan) does not know what the term absolute cleanliness, as used in the paper, means. If it means the keeping out of foreign substances, he would take issue with the statement. If the old acid theory has anything correct in it, we have mouths which are perfectly clean in which we have decay, and we shall have to go back further to find the producing causes of decay. Another idea expressed in the paper is that the mother must be surrounded by pleasant circumstances in order that her progeny may be well developed and have good teeth. If you will go to the pine hills of North Carolina or the hills and ravines of Tennessee and compare the hardness—not to say the absolute hardship—of the lives of the women there with the lot of those in the cities, you will repudiate the idea that the surroundings have anything to do with it. In former years he believed that there was something in the kinds of food used which had its influence on the development of the bony system, but later investigations have convinced him that there is no single article of food consumed but contains more lime-salts than is needed. There are only two pounds of lime-salts in the entire body, and the poorest diet you can find will supply it. The dried skeleton weighs six pounds, of which one-third is lime. Rice, which is one of the poorest foods in this material, contains $1\frac{6}{10}$ per cent. of lime-salts. A man who consumes two pounds of rice a day gets in a year about three pounds of lime, and if it takes seven years to wear out the skeleton, you see he has plenty of lime for its renewal. Plant-life will not flourish without lime. He has heard it said that there is no lime in this delta; but if you examine the rivers that flow into the Mississippi, you will find they pass through limestone regions, and their waters are impregnated with lime which is carried down and strewn all over the country, making this one of the most productive regions in the world.

All the dentifrices and mouth-washes that have been made have been compounded with one or both of two objects: to scour and

clean the teeth and to correct acid conditions and make the saliva more alkaline. He has not made any extended investigations, but some of the worst cases of decay that have come under his observation have been in the most alkaline mouths. He does not think the alkaline saliva itself destroys the tooth-tissue, but it supplies the conditions necessary to the breaking-down of the teeth, and he is more concerned over mouths which are excessively alkaline than about the acid mouths. The alkalinity is due to ammonia, and when this is brought into contact with the air we have nitric acid, which in its nascent state—just as it is forming—has the power to disintegrate tooth-bone. You will not find it in the mouth, but if you take out a piece of the tooth-bone you will find it there. In such cases we need something to neutralize the alkaline condition.

It has been the case that many dentists who have practiced in this Southern section have recommended stiff brushes, and have thus been the cause of untold destruction. A stiff brush denudes the teeth and produces absorption of the gums, and the teeth have to be filled in early life. He does not believe in temporizing too much with children's teeth. If they need treatment, cut out the tooth-tissue and fill thoroughly; let the work be done as perfectly as you know how to do it. If you make small fillings in young teeth with deep fissures, you will soon have to fill again. Those who cannot use gold may use something else; but whatever the material, let the work be well done. He did not exactly agree with Dr. Spalding as to the use of washes and soaps. Soap is a great cleanser, and, in certain cases, useful upon the teeth and gums; as, for instance, after eating certain condiments, to dissolve out the oily matters adhering. He has found local treatment of the gums useful. Some cases need a stimulant; others an astringent; sometimes an escharotic does when everything else fails.

Dr. James S. Knapp, New Orleans, agreed with Dr. Morgan that it is a great mistake to recommend a stiff brush. In addition to the injuries which have been named as being caused by its use, it may be mentioned that the teeth are sometimes grooved by the friction of a stiff brush and a harsh powder.

Dr. J. R. Walker, New Orleans, indorsed Dr. Morgan's views with regard to the thorough filling of children's teeth; but he would go further than to say that those who cannot use gold may fill with something else. In very poor teeth plastics should be used, but the work must be done thoroughly. He has never seen another locality where there is so great a prevalence of soft teeth as here in the Louisiana lowlands. Years ago he was led to believe that it was caused by the absence of lime in the air, in the food, and in the water of the region. Dr. Morgan has stated the benefits to be derived from

the Mississippi water; but it should be remembered that we use here very generally, for drinking and cooking, cistern water, which has been called the "sewage of the air." Some experience in attempting to overcome these conditions seems to demonstrate that the use of bicarbonate of lime is beneficial to mothers and their children. During a recent trip through Texas of several months' duration, he had some curiosity to observe if there was any difference in the teeth of people inhabiting a country where sulphate of lime abounds. He found magnificent teeth in a section where the rocks were largely limestone and where the water was all what is known as "gyp" water. If the fauna and flora are determined by the geological formation of the section where they are found, it would seem reasonable that the teeth and bones of the human species should be influenced by the same conditions.

Dr. B. H. Teague, Aiken, S. C., thought that while the scientists are disagreeing as to what causes decay, the average dentist is most concerned about the best hygienic measures. The simplest tooth-powder of which he has any knowledge is made of precipitated chalk. Many dentists have been in the habit of making their own tooth-powders; but after a while there comes a time when the demands of their practice are such that they can no longer attend to making powders. His own plan is to have a reliable druggist put up tooth-powder by a formula which he himself supplies. His idea about tooth-brushes is that the bristles should be quite long,—longer than those you generally see,—and separated into two or three rows, so that they will carry the powder into the interstices of the teeth with a kind of sweeping motion. He thinks the teeth are cleansed more effectively with this kind of a brush than with any other which he has seen.

Dr. Spalding did not mean, in his previous remarks, to condemn the use of local applications by those who need them, but simply to state his own practice. He had no call for them, having found a better way. On the food question he would remark that recent investigations have shown that fine flour is not all starch; that there is a perfect net-work of gluten pervading it, and that it is resident in the starchy portion of the grain,—more in quantity in fact than in the glutinous layer itself. Observation shows that the foods supplied contain all the elements necessary for the upbuilding of teeth; but why do we not have good teeth? It must be defective assimilation. He has no question at all of the utility of measures to have an expectant mother assimilate lime-salts for the causation of pre-natal influences. But these measures have not always been successful, but have frequently failed. The very food which is being consumed by the patient may contain all the substances which you administer

as medicine, but for some reason the system does not assimilate them properly.

Dr. J. Taft, Cincinnati. It might be worth while to inquire why there is occasion for so much effort to keep the mouth clean and pure. If we could once have a clear conception of the origin of these substances which lodge upon the teeth and gums, we would know better how to guard against their effects as exemplified in the condition we see. They come from various sources: from impurities in food or water being lodged on the teeth and retained there because of lack of use of the teeth; from defective mastication of proper foods; from the use of improper foods, such as pultaceous substances requiring little or no mastication. Either of these could be the source of the débris which is lodged in an undissolved state upon the teeth, and most of them could be avoided by the proper mastication of proper foods. The condition of the fluids of the mouth also has much to do with it. If these are healthy there will be very little of this trouble. We are probably all of us using foods that cause trouble in some portion of the mucous membrane, and the glands which secrete the saliva sympathize with its disturbances. How often do we stimulate undue secretion of the products of these glands; and so far as we abnormally stimulate them, so far do we interfere with the performance of the work nature intended them to do. So much is this the case that the mastication of ordinary food will not cause the proper working of the glands after they have been over-stimulated. Another way in which the saliva may become vitiated, and so promote impurity, is by evaporation through the mouth. Many persons sleep with their mouths open; the watery portion of the saliva is evaporated, and a rapid change in its physical condition is caused by the air passing over it. In every such case, on awaking, the mouth will be clammy if not dry, and with an offensive taste, and the mouth speedily takes on an offensive condition as its usual state. The way to get at this is to avoid these occasional conditions, whether sleeping or waking, when by respiring through the mouth the salivary fluids are contaminated as just described. Let us masticate our food well; let the child as well as the mother be impressed thoroughly with the idea that they should have proper food, and that it should be properly masticated. If these are attended to there will be no need of tooth-brushes. Let every child be taught that respiration should be through the nostrils, and not through the mouth; that all undue irritation of the mucous membrane and all undue exercise of the glands are to be avoided; that the mouth is not to be opened except for its legitimate purposes, and especially that it should sleep with its mouth shut.

Dr. Spalding. The air is full of fermentative germs, and the

mouth offers lodgment and nutrition to them. That is the cause of the bad taste in the mouth after keeping it open for a time. Dr. Taft said that the glands which supply the oral fluids are affected by changes in the mucous membrane. The speaker does not think the salivary glands are much affected by these changes in the mouth due to irritation of the alimentary canal, but the mucous glands are. These are excited and their secretion is physically as well as chemically changed; it becomes more viscid as well as more acid.

Dr. Taft replied that he had made no special point of this. All that he intended to convey was the idea that the saliva, when influenced by these causes, goes astray of its proper function. He agrees with Dr. Spalding as to the cause of the changes in the oral fluids. What we want to do is to educate the people who come into our hands so that they will avoid the causes which have been referred to, which is immensely better than to cure disease after it has occurred. The speaker has used phosphate of lime in mineral form, and with very good results, as he has thought, though he may have been mistaken. As illustrating the idea that surroundings do have something to do with formation of the teeth, he instanced a family which he said was a type of all in the neighborhood. The father was from New England, the mother from New Jersey, and both had good teeth. Every child in the family lost its teeth by the time or shortly after it arrived at maturity. The region in which they lived had no limestone, but was emphatically a sandstone country.

Dr. W. N. Morrison, St. Louis. With regard to the elements in natural foods, there is no doubt an abundance to supply bone-material to the body; but it too often occurs in early life that the demands of the organism for what we should call a natural diet, as the grain foods and meats, are diminished by the constant supply of sweets. These do not do direct harm, perhaps, but they take away the appetite for more nutritious substances, and when the child comes to the table it does not want bread or mush or other good, healthy foods. One thing which, in his opinion, promotes the troubles which have been spoken of is the long interval between meals. During this period, usually from four to five hours, the parasitic growths are almost undisturbed. If we could do as the animals do, eat every hour,—not heartily, but enough to keep the secretions in action,—it would be vastly better. He approved the forms of brushes handed about, and thought they would be excellent while new and fresh, but to secure durability the shapes should be reversed. He has had some brushes made in which the strongest part is where the most wear comes. He recommends rubber-dam cut into thin strips for use in cleansing the teeth instead of floss silk. Its advantages will be apparent at once.

Dr. J. S. Knapp could not agree with Dr. Morrison as to the desirability of greater frequency of meals. The trouble is now that we eat too often.

Dr. J. J. R. Patrick, Belleville, Ill. There is no question that in an attempt to convert an internal membrane into an external tissue, as in keeping the mouth open, we shall have a very unhealthy tissue lining the cavity of the mouth. With regard to the environment of man, it is everything in his advancement from the lowest to the highest. All the elements outside of the body are found inside of it. It is not necessary that you have limestone rocks to live among; there is not a blade of grass that is not full of lime-salts. It is the office of vegetables to convert minerals into proper form for the use of animals. What nonsense is it to feed lime-salts to a man whose regular food is overloaded with them. The trouble in his case is a lack of function. When we administer lime what guarantee have we that it will go to the right place? He fears we are trying to do too much when we attempt to reconstruct a tooth. He is satisfied that gentlemen who talk about it have forgotten what they undoubtedly must have known: that bone and teeth are made in the same way, with this difference, that the teeth are formed in a capsule hardening from the outside inwards, in a centripetal direction; while the bones harden from the center outwards, by centrifugal force. In old age there is no internal cavity in the tooth; the pulp has hardened perfectly. He is satisfied that, so long as you can find a patient throwing off the elements required for the formation of the tooth, it is not necessary to give him any more of them, because he does not appropriate what he already has. It is well established that a tooth is incapable of repairing itself except in its cementum, its most highly organized portion, which corresponds with the bones of the animal to which it belongs.

Dr. Wardlaw. Do the teeth of the pregnant woman break down to supply lime-salts to the bones of the child?

Dr. Patrick replied that he did not believe a word of it, unless the other bones do the same. A child while at the breast excretes no phosphates, although taking large quantities. Milk has 100 per cent. more lime-salts than any other food, and we don't find them anywhere else in so small a bulk and so perfectly prepared for administration.

Dr. Taft thought that nobody here had espoused the idea that the teeth can be built up without improving the other parts at the same time. All know that the bone-making material goes to all parts, and is deposited wherever there is a hunger or demand for it. Where we have deficiency in the teeth, as evidenced by tardy dentition and poor quality, we have a corresponding deficiency throughout the bony system.

Dr. Morgan thought Dr. Spalding was a little misty in his physiology, when he said that irritations of the alimentary canal do not affect the salivary glands. The speaker apprehended that just as soon as the nerves carry the news of any disturbance to the salivary glands you will have an increased flow of their secretions. If Dr. Morrison's suggestion as to eating was adopted, we should have an increased flow from the salivary glands, and we don't know what would be the effect on the stomach.

Dr. Spalding. We don't understand the subject of assimilation very well. Although we know the blood contains all the elements required by all the organs and is distributed to all of them, we also know that they do not all take of the elements in equal proportions. Much depends on the condition of the tissues to take in the elements needed. The blood plasma that goes to build up the teeth is precisely the same as that which goes to the other tissues and is wept out through the capillaries, and is taken up and assimilated by the parts which require it, or not assimilated, according as they are or are not in proper condition to receive it. What he wishes to impress is, that right here—in the assimilative functions—is the fault which we want to correct when we find a patient suffering from lack of the phosphates.

Dr. J. L. Mewborn, Memphis, thought that we should stimulate the part which we wish to improve, so as to determine the flow of the blood to that part. The soft foods so much in vogue in cities are what cause the difficulty in the teeth of their inhabitants. In country districts the coarse food which is the usual diet causes increased stimulation by the force exerted in mastication, and we accordingly find good teeth. If you want good teeth, give them plenty of work.

Dr. Walker wanted to enter his protest against one or two points that have been made. One point he would make is, that we do not want it to go out that we indorse the use of tobacco or chewing-gum, or anything else to stimulate an undue flow of the saliva; and the other is, that we do not advocate taking food oftener than digestion can be accomplished.

Adjourned till 9 o'clock to-morrow morning.

(To be continued.)

The annual election was held Friday evening, April 3, 1885.

Nashville, Tenn., was selected as the next place of meeting, and the time was fixed for the fourth Tuesday in May, 1886.

The following officers were elected: W. C. Wardlaw, Augusta, Ga., president; B. H. Catching, Atlanta, Ga., first vice-president; J. Rollo Knapp, New Orleans, second vice-president; E. D. Hamner,

Galveston, Texas, third vice-president; E. S. Chisholm, Tuscaloosa, Ala., corresponding secretary; R. A. Holliday, Atlanta, Ga., recording secretary; H. A. Lowrance, Athens, Ga., treasurer; G. F. S. Wright, W. H. Morgan, and W. H. Richards, executive committee.

NEW YORK ODONTOLOGICAL SOCIETY.*

The New York Odontological Society held a regular monthly meeting, February 17, 1885, at the house of Dr. S. G. Perry, No. 46 West Thirty-seventh street.

The president, Dr. William Jarvie, in the chair.

Dr. E. A. Bogue. If incidents of office practice are in order, I have something to present. I have in my hands a very ingenious little disk-holder, which is the device of Dr. J. W. Smith, of Newport. It is designed to catch those paper disks that cut upon the edges and do not cut in the center,—a device that will allow us to contour fillings and not cut away the knuckles of contact. I hope the gentlemen will carefully examine it, and, if they feel like giving Dr. Smith the same credit that I do, he will receive a round of applause.

President Jarvie. Gentlemen, you are all aware, from the card containing a notice of the meeting, that we expected Dr. Harlan, of Chicago, to be here this evening and read a paper.† The heavy snowstorms in the center of this State and farther west have blocked some of the railroads, and our essayist is at the present time blockaded somewhere between here and Schenectady, with the essay probably in his pocket. We are sorry, of course, that our Chicago friends—and there are several of them in the party—are subjected to this inconvenience and discomfort, and we are also sorry on our own account to be deprived of the pleasure and profit of listening to the paper. We shall have to rely upon ourselves to fill the time the paper and its discussion would have occupied. However, we need not fear that we shall not be entertained, having with us this evening many of the most eminent men of our profession. As many of you are aware, the subject of Dr. Harlan's paper has been under discussion once before in this society. Articles have appeared from time to time in the New York *Medical Record*, reflecting very severely upon the practice of leaving in the mouth what they are pleased to term *dead teeth*, meaning by that teeth that are without live pulps, and summing up with something to this effect: That

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* In consequence of the length of this report and the demands upon our pages, we have been compelled to abbreviate the remarks of nearly all of the speakers.

† See page 257, current number of the DENTAL COSMOS.

the injury inflicted upon the health and comfort of the community by this practice is much greater than the benefit derived from the operations of the most skillful dentists; in other words, that the community would be a great deal better off if there were no dentists. Dr. Bogue has some notes on this subject which we shall now be glad to hear.

Dr. E. A. Bogue. Mr. President, in obdience to your request, I will offer a few remarks on the subject. First, then, I suppose pulpless teeth, not dead teeth, are the organs under consideration. This being the case, I may say that fillings are never the direct means of retaining pulpless teeth or roots in the jaws; they are to be regarded only as stoppers or plugs against the *in*gress of deleterious substances into those teeth or roots, either from above, *i. e.*, the apical foramina, or below, *i. e.*, the openings into the mouth. They should if possible be inserted before decomposition of the dead pulp has produced a suppurative effort to throw off these mephitic products. If, however, the pulp has through neglect undergone putrefactive decomposition, then the products of that decomposition should be removed, the root canals should be thoroughly cleansed, deodorized, dried out, and rendered permanently aseptic, like an Egyptian mummy. When this is done, the contents of the dentinal tubuli are rendered as bland and innocuous as the hard-boiled white of an egg The cementum, with its low degree of vascularity, is not irritated or contaminated any more than it would be by the vitrified dentine of the octogenarian, and the tooth fulfills its functions generally with entire comfort. Many cases can be produced of from twenty to forty years' standing. The dentinal tubuli may absorb the products of decomposition of a dead pulp, if that be left in the canals, and through that medium the cementum may become contaminated, and so the pericemental membrane may absorb the morbific matter. To the non-recognition of this fact may be attributed many of the failures in the attempt to treat teeth with dead pulps. It will be kindly noticed that I said teeth with dead pulps; I did not say pulpless teeth. Pulpless teeth,—that is, teeth without pulps,—if their roots are antisepticized and filled accurately even with cotton (which is sufficient in experiments for sterilization to prevent the passage of micro-organisms), are little prone to give their owners trouble, but teeth with dead pulps in them are fully open to most of the objections brought against them by recent writers.

Uniform success in treating devitalized teeth cannot be assumed so long as arsenic is used as an obtunder as freely and as carelessly as it has been in the past by a great many practitioners, becoming not infrequently the cause of the death of the pulps of teeth long after the operations on them have been terminated. Teeth "divested

of periosteal nourishment by tartar" could not generally be kept in the mouth; they would fall out of themselves very often; besides, it may be said that tartar is not a cause but an effect of disease. Indeed, it has been remarked by several observers, widely separated from one another, that Bright's disease in some stage may be looked for whenever pyorrhea alveolaris is distinctly marked. I believe it is generally conceded that reflex trouble, having its origin in diseased teeth, is often met with by the oculist and aurist. If those diseased teeth cannot be so treated as to render them *easy* and comfortable, there would be, I should suppose, no question as to the advisability of extraction.

I should be glad to know that sufficient instruction was to be given in the medical schools for the general practitioner or the aural specialist to be able to distinguish between pulpless teeth in good condition and dead teeth.

Dr. J. Smith Dodge, Jr. While I have no criticism to make of the paper as a contribution of the gentleman who presents it, I shall hope it will not go forth as the official expression of this society.* In the first place, it would be giving too much notice to an attack upon a well-established practice of dentistry,—an attack which neither in its nature, which was precipitate and evidently based upon slight examination, nor in any widely recognized standing of those who make it, deserves such elaborate refutation. It is not becoming to an individual, and it is not becoming to a society making the claims that the Odontological Society makes, to turn out of its course to give very prolonged attention to everybody who may make a fling at it. I have already been impatient at the amount of attention which dentists are giving to this slight and inconsiderable attack. I could wish that the only answer it had received might have been a smiling assurance to the editor of the *Medical Record* and to Dr. Sexton, and whoever else has taken part in it, that all they have said only shows that, instead of presuming to instruct dentists in the management of teeth, they are sadly in need of going to dentists to be instructed themselves. I think the dignity of the Odontological Society requires that, if any expression be made, it should be more brief, and should far more insist that in a matter like this, belonging to our own profession, we are not to be schooled by the editor of a medical journal, nor by a medical specialist in any other department. These gentlemen have seen a few dead teeth, as they call them (and for my part I have no objection to the expression; a part of a man is still alive when you call him

* Several allusions to a paper or report by Dr. Bogue necessitate the explanation that it did not accompany the report of the proceedings.

dead,—at least Christians believe so,—and a pulpless tooth may be called dead although a part of it is still alive),—these gentlemen have seen a few dead teeth to which circumstances called their attention, and have hastened to draw a general conclusion and make a great outcry. They know nothing of the innumerable teeth which the gentlemen in these rooms have treated, and which they have never had any occasion to observe after the treatment was completed; and if those gentlemen have not taken pains to inquire whether there is another side to the question, then they have committed the inexcusable fault, in scientific matters, of basing a wide decision upon a one-sided and very limited observation of facts.

Dr. W. G. A. Bonwill. I thought I had something to say on this subject, but the remarks of the gentleman who followed the reader of the paper have left me very little to say. I think the medical men who have made this attack have "*no case*." If the gentlemen who have written on this subject in the *Medical Record* had consulted some competent, conscientious operators in dentistry, they would not have published those articles. It is an insult to the profession and to the judgment and experience of even the most ordinary dentist, and it is beyond all courtesy that we should make any answer to it. But possibly a few words may be said that might tend in the future to put medical gentlemen more upon their guard in what they say against dental practice, about which they evidently know so little. To say that pulpless teeth are worthless, or necessarily injurious, is simply absurd; and the man who says they cannot be saved, retained in the mouth and made useful without injury to the health, has had no experience in the matter. It is time we take a position and place ourselves on record and become recognized as special surgeons. My experience in regard to this particular condition of teeth (pulpless teeth) has been that ninety to ninety-five per cent. (I do not think that is saying too much) has been the measure of my success. Since I have been using artificial crowns so extensively, my success has been such that I have been led from one point to another until I have taken a great many roots that have been pulpless for years, and that were so loose that you could almost remove them with your fingers, and have treated them and placed upon them artificial crowns that were properly antagonized with the opposing teeth, and the results of these operations have been remarkable. It is astonishing how nature responds when you give her something to do. When teeth are properly antagonized renewed nutrition takes place, and the teeth are brought back to their original firm and useful condition. If these medical gentlemen would make themselves acquainted with the condition of the pulpless teeth that have been treated, and that are doing good service in

the mouth, without any injurious effect upon the health, instead of confining their observations to cases where the health seems to have been affected by them from bad treatment of incompetent operators, they would arrive at a different conclusion, and leave the treatment of teeth to dentists.

Dr. J. E. Garretson. The members of the dental profession in their practice and in themselves need no defence. Art is long; time is short. There is too much to do in the way of learning of things unknown to find time to get back to first principles related with things that the dental specialty has familiarized itself with years ago. It is not the business, as it seems to me, of this society to concern itself with what an antagonist knows or does not know relating to what it has made its special work. For myself, I would put the matter under discussion somewhat aphoristically, as follows: If a pulpless tooth were a dead tooth, and if nature was never found to endure nor to provide within the human domain for the continuance of a dead body, then there would be but a simple, single line of practice in the direction considered,—namely, a dead tooth should be extracted. A pulpless tooth is not necessarily a dead one; nor, on the other hand, is it the case that a tooth, although entirely dead, will not have its presence endured by some or by many systems. The principle being as here enunciated, practice resolves itself into a consideration of individual cases. Pulpless teeth are to be left in place or otherwise taken away as per indications.

I do not want to be understood as reflecting, even in thought, against Dr. Sexton. I have not happened to know of the gentleman until his name was alluded to in the paper that invited me here. I do not know whether he is a great or a small man in New York, but I am compelled to conclude that he certainly does not understand entirely the matter of pulpless teeth; that is, if he insists that all such organs are to be taken out of the mouth. All present know that, as far as pulpless teeth are concerned, we are to take the principles under which stated conditions exist, and apply them. Now, there are cases, and all know of them, in which treatment fails. When a man comes to me and tells me he never loses a tooth—well, there is an involuntary shrug of the shoulders; a physician might as well say he never loses a patient. If there are people whose systems will tolerate a mouthful of pulpless teeth, it would not seem unjust to assume that there are other systems that could not endure a single dead tooth; and with the existence of these converse conditions we are well acquainted. We know there are people that will endure a mouthful of dead teeth, and we know there are cases where to fight a single pulpless tooth requires all the skill

one is master of. A perfectly organized person is a temperamentless person; that is to say, in a perfect organization no system predominates,—equilibrium is absolute. But a perfect man is about as hard to find as is a perfect horse; therefore, I do not know that one may be able to say what would be the condition in which exact definition may be made as to how a pulpless tooth will act. You are learned men as to your specialty, and you alone are to be the judges as to pros and cons. How can you feel offended because a man says a dentist does not know what he is about when he leaves pulpless teeth in the mouth? Do you not know that it is the fault-finder who does not know? Out of a man's own mouth is his condemnation. I often say to my boys in the college, "Because you happen to know something more in a certain department than such or such a man knows, you are not to forget that he may know many beautiful things in directions where you may be ignorant." I thought, when I heard of this dispute, that it was a very happy thing; for, if Dr. Sexton would come and talk with you, you would quickly teach him a great deal on a subject where his opportunities to get experience have not equaled your own. On the other hand, as a professor of otology, this gentleman is assuredly possessed of many special experiences which must be of great value, and which would afford valuable exchange for what he assuredly could have in barter. For myself, I like to be doing a constant trade with fellow professionals. I have little doubt that the otologists and odontologists could spend many profitable hours in each others' society, parting with increased mutual regard and esteem, and carrying away on either side more than was brought.

Dr. Allport. While there is undoubtedly something in the ideas advanced by Dr. Sexton, he has magnified and made altogether too much of them. On the other hand, those who have tried to controvert what he has said have laid altogether too much stress and importance upon the saving of this class of teeth, and have asserted too positively the certainty of our being able to save them in a healthy and harmless condition.

If Dr. Sexton had said that these teeth do sometimes give trouble, no matter how well treated, he would have been correct; and if, on the other hand, we would admit that we cannot always treat them so that they will not give trouble, this would also be correct. We should then both stand upon tenable ground.

A few weeks ago, at a meeting of the Chicago Dental Society, there was a paper read upon "The Treatment of the First Permanent Molar Teeth." After the paper had been pretty thoroughly discussed in other respects, the president, Dr. Harlan, remarked that he would like to hear something said upon the treatment of

these teeth after they had lost their pulps, and I was requested to give my views in relation to the matter. What I said was reported, and just as I was leaving home the stenographic report came for my revision. I have it with me, and, as it expresses my views quite clearly, at the risk of repeating what I then said, I will, with your permission, Mr. President, refer to it.

Some things that have been said both for and against retaining these teeth have been well said, whilst some other things have been said that had better have been left unsaid. Whatever of truth has been urged against the practice in general of retaining them is eminently so with regard to young patients, for the injury done must be consequent upon the presence of gases that are generated by the decomposition of organic tissue within the pulp canal and dentine, or by its septic influence upon the surrounding tissues. This irritation may be produced at the apex of the roots, or possibly through the cementum upon the pericemental tissue. The younger the subject the greater the amount of organic tissue in the dentine, and consequently the greater the amount of gases which will be formed by the process of decomposition, and the younger the subject the more certain will deleterious effects follow the retention of these teeth. It is true that the roots may be filled, which will go far toward preventing unfavorable results. But, as my friend Dr. Bogue has remarked, it is not enough to fill them, for their permanently healthy condition will depend very much upon their treatment before they are filled. But the greatest skill in treating and filling will not always prevent unfavorable results. Alveolar abscess is not the only disease that may call for the removal of these teeth, and the neural troubles urged as a cause for their extraction seldom arise from acute inflammation or from alveolar abscess. It is not altogether improbable that diseases of the eye and ear, that have been mentioned in the discussion in the *Medical Record* and other journals as the result of retaining these teeth, are sometimes traceable to them. The low form of irritation so frequently produced in the peridental membrane by the gases generated in the root canal or in the tubuli of the dentine is the most fruitful source of reflex nervous conditions associated with the teeth, and many times these reflex troubles will result in an irritation so slight as to be very difficult of detection, even after a most careful examination. Sufficient proof of the correctness of this statement is found in the frequent cure of the diseases by the extraction of teeth hardly suspected as the cause of the trouble.

To illustrate: A patient of mine, who suffered severely from neuralgia, had been under the care of different physicians for several years without obtaining the least relief. I had frequently exam-

ined his case, and had absolutely examined the tooth which subsequently proved to be the offender, but never found apparent trouble enough to warrant its removal. He finally fell into the hands of Dr. Haskell, one of our most skillful mechanical dentists, still suffering agony with neuralgia, and, for the purpose of putting in an artificial denture, he removed this single root, and the neuralgia was immediately cured. There was a low form of irritation there, but so inconsiderable was it that pressure upon the tooth produced but a slightly unpleasant sensation, and I really did not feel justified in removing the tooth for the purpose of relieving the neuralgia; yet the extraction of the tooth relieved him of his trouble. It is not acute inflammation, but a low form of irritation, that is most productive of these reflex disturbances, in which statement I am quite sure Dr. Garretson will agree with me.

If these conditions are produced by the retention of pulpless teeth, we should exercise a wise caution in retaining them, and especially should this be the case in the mouths of our young patients.

Dr. Darby. There were one or two points raised this evening that I would like to touch upon briefly. One is the term "dead teeth." We do not mean *dead* teeth. A tooth has other sources of vitality than its pulp. When the pulp has been removed it is not necessarily dead. It is a misnomer to call a pulpless tooth dead, as almost every gentleman who has spoken here to-night has done. There is no reason why a tooth that has lost its pulp should not be comfortable in the majority of cases, provided it has been properly treated. We occasionally meet with constitutions or temperaments that will not tolerate pulpless teeth, but they are rare exceptions. Allusion has been made to the treatment of such teeth subsequent to the removal of the pulp, the materials to be used for filling canals, etc. It seems to me that the very best material for that purpose—and, in my opinion, the ideal substance—is the oxychloride of zinc. It possesses antiseptic qualities that are valuable. Nothing could more completely fill a canal than this, when properly applied. Who has ever removed a gold filling from a pulp-canal and not found a disagreeable odor present? I do not remember to have ever found such an odor when opening into a tooth the canals of which had been filled with oxychloride of zinc.

Dr. Brackett. If I should say anything in the two minutes alloted me—and two minutes are ample for it—it would be this: That all of this question, as a matter of practice, is resolvable into a few simple principles. If the dentist is a tooth-carpenter, and does his work merely as a mechanic, he is certainly open to criticism from a medical stand-point; but if the dentist is a pathologist, if he is a scientific man, he looks upon it as governed by certain princi-

ples, and those principles are the same principles of pathology that govern all expressions of disease and discomfort in all parts of the human system. It is from this stand-point that the dentist should approach his work, with a knowledge and appreciation of all the pathological conditions,—notably of such a pathological condition as inflammation, through the different steps of irritation, determination of blood, and congestion, with the sequelæ of that inflammation, as effusion, suppuration, gangrene, and necrosis, with all their combinations and various circumstances and their influence upon the economy. So, this question of the treatment of devitalized or pulpless teeth, from that stand-point, becomes one in which the decision is to be made upon general principles; and these general principles, of course, teach us that that which is allowable and advisable to be done in one case may not be equally so in another case. We should say that a surgeon who invariably removed every diseased member, thereby to remove the disease, was not pursuing a wise and judicious course; and just so, in the application of the same general principles, we may say that the dentist or the oral surgeon who removes every pulpless tooth is not pursuing the best course. The advisability of retaining or not retaining pulpless teeth depends very much upon general principles and conditions that are familiar to all of us, and that have been in some form or other expressed here before us to-night. The general tone of the system; the general nourishment, ill or good, of the system; the general nerve-tension; susceptibility to irritation and tolerance of irritation, and all of the principles that govern surgical practice with reference to deleterious reflex influence, are, it seems to me, applicable to this matter under discussion. Therefore, I think it is a most hopeful and happy sign of the times that our dental schools are teaching not merely the mechanics of dentistry, but, so far as time and capacity permit, are teaching the general principles of pathology applicable to the diseased conditions that come particularly within our specialty; and it is from this broad stand-point, gentlemen, that this question should be viewed, and on this general ground the medical and dental practitioners may meet in entire harmony.

Dr. Winder. I think all has been said on the subject that should be. I certainly do not wish to discuss before this intelligent audience the propriety or necessity of retaining or removing pulpless teeth. It is a matter too thoroughly understood by all present. In regard to the gentleman who made the attack in the *Medical Record*, I think if he had reflected upon the past experience of medicine he would hardly have criticised a sister specialty in the way he has done. I commenced the study of medicine at the University of Virginia in 1847, and since then, when I look back upon its past,

even for this short period of its existence, I do not feel happy; too many fallacies and false teachings pass in review. When I call to mind that in this country, and all over the world, the medical profession has been constantly changing its modes of practice,—now accepting, now discarding, some dogma; its whole march of progress marked with the most serious blunders and mistakes,—so much so that Professor Nathan R. Smith, in a public lecture in Baltimore, in discussing the question whether medicine had done more good or more harm in the world, said that he could not answer the question; surely a gentleman well posted as to the shortcomings of his own profession would hesitate to throw stones at the glass houses of other people, or to criticise in any captious spirit a young and growing specialty, or exhibit any great willingness to remove the mote from a brother's eye.

Dr. L. D. Shepard. The only good, it seems to me, which can come of such discussions is that we are thereby more fully aroused to the importance of always doing thorough work, and that the best views of those who confessedly do the best work are distributed more extensively throughout the profession. While these attacks upon our methods have been read probably by most of the medical men and dentists in Boston and have been discussed a little, there has not been the least ripple raised in either the medical or dental professions. With us the relationship between the specialists and the general practitioners is most cordial and confidential. It is an every-day occurrence for the surgeon and the physician to send to the dentist a patient for his examination, in cases where the general practitioner is in doubt, particularly in regard to some blind cases of neuralgia; and some of the pleasantest and most successful cases of treatment have been those in which that mutual confidence has been manifested. My experience is that in these personal matters one of the chief causes of the unpleasantness is a misapprehension of the facts; and I think the wisest course to take is simply to quietly go about one's business, do his duty as he understands it, and let such little excitements die out, as they are sure to do in a short time.

Adjourned.

E. T. Payne, D.D.S., *Secretary.*

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a regular monthly meeting, Tuesday evening, March 3, 1885, in the rooms of The S. S. White Dental Manufacturing Company, corner of Broadway and Thirty-second street.

The vice-president, Dr. William Carr, in the chair.

Dr. C. F. W. Bödecker, chairman of the Clinic Committee, reported as follows: At the clinic, to-day, Dr. Theodore Weber presented two patients with cleft palate. For one of them he had constructed a plate with a bulb which enters the cleft of the soft palate. The apparatus had been worn for nearly three weeks, and the patient showed some improvement in speech. The other patient was merely exhibited to show the difference in reading with and without the apparatus, which was constructed at the clinic before the Central Dental Association of Northern New Jersey two weeks before. Of course there was not much improvement, but enough to be noticeable. Both cases were congenital clefts. Dr. J. A. Bishop, of this city, kindly brought one of his obturators, and also one of the old Dr. Stearns's apparatus, the first soft-rubber vela that were ever constructed. There was also exhibited (I think by Dr. W. E. Truex) a tooth which had been removed from the position occupied by the left upper central, in shape resembling a regular molar, but not quite so large, and with but a single root, which was very thick and bulky, and about the normal length of the root of a permanent third molar. Dr. J. Allen Osmun, of Newark, N. J., sent a patient about ten years old, with a cleft palate and hare-lip upon which an operation had been performed, but not with great success. The lip was firmly attached to the gum and the superior maxillary bone, and was thus immovable. The boy could not articulate at all. The upper lip was so out of proportion to the lower one that Dr. Goodwillie, who was present, advised another operation for the purpose of loosening the upper lip, and to bring the nose, which was rather high, a little downwards, and also to remove some atrophied tissue from the septum of the nose. Dr. Goodwillie thinks he can, by another operation, make the boy present a much better appearance, and that afterwards an obturator can be worn. Dr. Reese, of Brooklyn, presented a patient for whom he had put on, with the Reese metal, two artificial crowns—the right superior cuspid and second bicuspid. Dr. Reese assured us that the roots were nothing but very thin shells, and that with no other method would he have obtained as good results. The method I will describe: The root-canal, previously dried, is pressed full of wax, and to this is attached a plain rubber tooth. The tooth and wax are then withdrawn and the wax hardened with ice. After replacing it, to insure perfect position, the wax model with the tooth in position is put into a flask and cast in the same manner as an ordinary Reese metal plate. It will then be found to fit the root exactly. Dr. Reese fastens the crown to the root with a very little thin oxyphosphate. The attendance at the clinic was between sixty and seventy.

Incidents of Office Practice.

Dr. Frank Abbott. What I am about to offer, while perhaps not exactly an incident of office practice, is certainly an interesting subject, I think, to all present. We have heard not a little during the past few months about the Herbst method of rubbing gold into teeth. Believing that a process might be employed that would be even easier, more rapid and accurate in its operation, possibly, than that with the engine, I have had some instruments made to carry out my idea. Dr. Shumway, of Plymouth, Mass., was the first, I believe, to introduce the method of condensing gold in teeth with smooth ivory-pointed instruments, and since that time I think he has modified his instruments, now using steel. This was spoken of in a paper read before the New York Odontological Society, some months since, by Professor Fillebrown, of Harvard University. Not being particularly impressed with any of the instruments I had seen, I presumed to invent some of my own. They are, as you see, to be used by hand, and consist of six instruments, graduated in size from small to large, curved at an angle of about thirty degrees, having on the end a smooth bulb somewhat of the form of a ball burnisher, but differing from it in that they are gradually tapered from the largest portion to the neck. The instruments were made for me by Mr. Biddle, and are tempered particularly for the purpose they are intended to serve. The end of the instrument is almost as hard as steel can be made, and the neck so tempered that it will not easily break. In using these instruments I place a thick layer ot gold at the cervical wall, where I have the opportunity in a large cavity, rubbing it firmly against the wall. In the centre of the filling I use the automatic mallet, but carry the gold against the walls of the cavity with these burnishers, following with the mallet as the centre is reached. By this means the danger of cracking off bits of enamel from the walls is more surely avoided.

Dr. Hodson. How do you get your cohesion?

Dr. Abbott. One would suppose the gold would not cohere under an instrument so smooth as those are, simply by putting one layer upon another and rubbing the instrument over them; but that in a measure is a mistake; it will cohere to such an extent that if you fill a cavity or a steel matrix with it, and take out the plug, it is apparently as solid as though driven in with a mallet; showing that there is a much more solid continuity of the gold than it would be supposed possible to obtain in that way. However, I do not consider the cohesion sufficient for contour work. The advantage of this instrument is that it can be applied in places where it is impossible to apply the engine instrument without a sacrifice of tooth-

substance. With it I use Wolrab's, Williams's, or the gold made by The S. S. White Dental Manufacturing Co. Either kind may be used in the same manner and with about the same results. This style of operating will enable us to use a kind of gold that may with greater facility be adapted to the teeth than that we have heretofore been in the habit of using, and save both time and labor. It is necessary to frequently cleanse the instrument of adhering gold, when the slightest stickiness is perceived, and for this purpose I use chamois covered with rouge, upon which the instrument is rubbed for a moment and is again in perfect order. The shape of the instrument is such as to readily leave the gold where it has been placed. I understand that Dr. Herbst has himself been using for a long time instruments by hand instead of with the engine.

[President Northrop takes the chair.]

Dr. Bödecker. I will say a few words about agate points, which I have used for the last six weeks, and with the greatest success. They were procured for me by Dr. Timme, of Hoboken, N. J. With these instruments all necessity for cleaning the burnishers is done away with, and the rotation can be carried to such a high degree of velocity that the gold is made wonderfully cohesive and extremely hard without causing the slightest reaction of heat,—consequently without pain to the patient. The first grinding surface I filled in that way was for a lady who has always objected to the use of the mallet upon any of her teeth, and therefore it seemed to me a good case to experiment upon with the agate points. I used them for filling the entire grinding surface, the upper portion of which I generally complete with the mallet. When I took my corundum point to finish off the filling, I was astonished to find that it did not yield, and, thinking the corundum point was clogged or had been heated, I took up another, but it had no more effect than the first one. Since that time I have made several other grinding-surface fillings by the same method. When the cavities are large and can be got at nicely, by using a pretty good-sized agate point, there is certainly, as far as I can see, an especial advantage in this method of operating. Any kind of gold, even the higher numbers, may be used, laying it the same as in any other method of filling. Take several leaves of gold together and rub them over with the agate point, and they will be found inseparably connected.

Dr. Abbott. There are certain considerations in reference to the agate point for the engine that are, perhaps, objectionable. One is that the point of junction of the agate and the steel must of necessity be considerably larger than an all-steel one would have to be, or than the agate would have to be alone. That makes it difficult to get the point into a cavity to the necessary depth, unless the orifice

is quite large. Then, again, if the agate is run into a very deep cavity, there is danger of breaking it by pressure. Another difficulty is in keeping the agate in the steel head solidly, so that it will not wiggle around after using it a little. Another, that may not have been noticed, is the difficulty of making the agates as small as we require them, and perfectly round. From what I have seen of them, they do not seem to be as perfectly round as steel can be turned; but there is a very serious objection to the use of steel, which Dr. Bödecker has spoken of,—namely, the heat caused by friction, which is so great as to cause the patient considerable disturbance; and also the clogging of the gold, which sticks to the instrument and leaves it in a rough state. To produce the condition that Dr. Herbst calls the cohesive surface, the patient is made uncomfortable, and the instrument requires frequent running upon some substance to remove the adhering gold.

Dr. Bödecker. Dr. Abbott speaks of the difficulty of getting perfectly round agates, and I was of the same opinion as he in regard to it, and told Dr. Timme that they were not good on that account, but when I came to use them I found that instead of this being an objection it was a decided advantage. Since then I have made use of small burnishers that are four-cornered, which I obtained from The S. S. White Dental Manufacturing Co., and you have no idea how much faster they solidify the gold. It is certainly true that agate breaks very easily, but where its rotation is at a high velocity you do not need to apply any great pressure. The facility with which it will condense the gold and adapt it to the walls of the cavity is simply charming. I have examined some of the fillings with a microscope that I had made for that purpose several years ago, and I found them absolutely perfect; there is not a single defect to be seen in them, even with a power of two-thirds. That is to say, almost every filling made with the mallet that I have examined under the microscope showed many imperfections, but the fillings burnished around the edges of the cavity by means of the agate points are absolutely perfect.

President Northrop. We will now hear from our excellent friend, Professor Garretson, of Philadelphia, with whom most of you, I presume, are better acquainted than I am, and I therefore need not introduce him.

[The report of remarks made by Dr. Garretson we are unable to publish in the present number, owing to lack of time on the part of this gentleman to revise the proof. We trust it will be furnished in time for our succeeding issue.—Editor Dental Cosmos.]

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The third regular meeting of the National Association of Dental Examiners was held in Tulane Hall, New Orleans, on Tuesday, March 31, 1885.

The State boards of Ohio, Indiana, Illinois, Michigan, Georgia, Louisiana, South Carolina, Kentucky, Mississippi, and Maryland were represented by the following gentlemen:

J. Taft and H. A. Smith, of Ohio; S. T. Kirk, of Indiana; A. W. Harlan and Geo. H. Cushing, of Illinois; J. A. Robinson and A. T. Metcalf, of Michigan; G. W. McElhaney and J. H. Coyle, of Georgia; J. S. Knapp, L. A. Thurber, O. Salomon, and J. R. Walker, of Louisiana; G. F. S. Wright, of South Carolina; A. O. Rawls, of Kentucky; A. A. Dillehay, R. J. Miller, W. T. Martin, and W. H. Marshall, of Mississippi; Richard Grady, of Maryland.

The greatest harmony prevailed in their deliberations, and after the fullest consideration the following resolutions were adopted:

Resolved, That this association recommends to all State boards of examiners that registration should be made with both the examining boards and the clerks of the county courts.

Resolved, That this association thinks that all examinations of candidates by State boards should be conducted principally in writing, and that a record of such examinations should be kept by the secretaries of the boards.

Resolved, That, in the opinion of this association, a diploma from a reputable dental college should be considered as the only evidence of qualification for those who seek in the future to enter the dental profession, and that we recommend to all State boards to secure, at the earliest practicable moment, the amendment of existing laws so as to attain this end.

Resolved, That the appropriation, by any person, of any title or appellation to which he is not justly entitled and by which deception and fraud may be practiced is, in the opinion of this association, highly reprehensible, and should be prohibited by legal enactment.

Resolved, That this association deems it undesirable that State examining boards should be composed of gentlemen serving as professors in dental colleges, and recommends to the appointing powers of all States that, so far as may be possible, the places of such professors, when their terms of office expire, be filled by those not holding such positions.

The association adjourned to meet in Minneapolis on the first Tuesday in August, 1885.

Geo. H. Cushing, *Secretary.*

VERMONT STATE DENTAL SOCIETY.

The ninth annual meeting of the Vermont State Dental Society was held at the Van Ness House, Burlington, March 18 and 20, 1885.

The following officers were chosen for the ensuing year:

G. H. Swift, president; R. W. Warner, first vice-president; W. H.

Wright, second vice-president; T. Mound, secretary; James Lewis, treasurer; C. F. Lewis, W. S. Curtis, and J. P. Parker, executive committee.

The next meeting will be held at Bellows Falls, on the third Wednesday in March, 1886.

T. MOUND, *Secretary*, Rutland, Vermont.

CHICAGO DENTAL SOCIETY.

THE annual meeting of the Chicago Dental Society was held on Tuesday evening, April 7, 1885, at which the following officers were elected for the ensuing year:

C. F. Matteson, president; G. W. Nichols, first vice-president; W. A. Stevens, second vice-president; A. W. Hoyt, recording secretary; P. J. Kester, corresponding secretary; E. D. Swain, treasurer; J. H. Wooley, librarian.

P. J. KESTER, *Corresponding Secretary*,
628 West Lake street, Chicago, Ill.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE second meeting of the National Association of Dental Faculties will be held in Chicago, commencing Friday, July 31, 1885.

By order of the executive committee.

C. N. PEIRCE, *President*.

INDIANA STATE DENTAL ASSOCIATION.

THE twenty-seventh annual meeting of the Indiana State Dental Association will be held at Lake Maxinkuckee, commencing Tuesday, June 30, 1885. The State Board of Dental Examiners will also meet at the same time and place.

R. W. VAN VALZAH, *Secretary*,
Terre Haute, Ind.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE Dental Society of the State of New York will meet at Albany, N. Y., on Wednesday and Thursday, May 13 and 14, 1885.

The Board of Censors will meet at the same place May 12, for the purpose of examining applicants for the degree of Master of Dental Surgery (M.D.S.) For information as to the requirements of the board, application should be made to Dr. N. W. Kingsley, chairman, 25 West Twenty-seventh street, New York, or to Dr. Frank French, Rochester, N. Y.

J. EDW. LINE, *Secretary*, Rochester, N. Y.

NORTH CAROLINA STATE DENTAL ASSOCIATION.

THE eleventh annual meeting of the North Carolina State Dental Association will be held in the city of Charlotte, commencing the first Tuesday in June, 1885, and continuing three days.

A cordial invitation is extended to members of the profession in this and adjoining States to be present.

THOMAS M. HUNTER, *Secretary*,
Fayetteville, N. C.

MASSACHUSETTS AND CONNECTICUT VALLEY DENTAL SOCIETIES.

A union meeting of the Massachusetts and Connecticut Valley Dental Societies will be held at Worcester, Mass., on the 24th and 25th of June, 1885.

Details may be looked for in a later notice.

C. T. STOCKWELL, Springfield, Mass.

BOSTON DENTAL COLLEGE.

THE eighteenth annual commencement of the Boston Dental College was held at Memorial Hall, Boston, Mass., on Wednesday, April 1, 1885, at 7.30 P. M.

The annual address was delivered by Rev. Francis B. Hornbrooke, and the valedictory by Frank W. Kyes, D.D.S.

The number of matriculates for the session was thirty-nine.

The degree of D.D.S. was conferred on the following graduates by the president of the college, I. J. Wetherbee, D.D.S.:

NAME.	RESIDENCE.
Edwin Oscar Blanchard.	
Eugene M. Brown	Massachusetts.
Frank Herman Clock	Massachusetts.
Herbert D. Currie	New Brunswick
Elmer Ellsworth Eddy	Vermont.
Wilmer Stuart Elliot	Massachusetts.
Edmund G. Flint	Massachusetts.
Charles Aaron Fox	Massachusetts.
George E. Hathorne	Maine.
Charles E. Helah	Maine.
George H. Hoadley	Vermont.
Harvey Martelle Kirk	Ohio.
Frank Winslow Kyes	New Hampshire
Charles A. Leslie	Massachusetts.
Fred Harris Metcalf	Vermont.
Fred Carville Merrill	Massachusetts.
Joseph A. Moriarty	Massachusetts.
C. F. A. Pagenstecher	West Indies.
James Earle Pease	Massachusetts.
Charles B. Pierce	Massachusetts.
Freidol S. Putnam	New Hampshire
William R. Sawyer	Massachusetts.
Cyrus Tyler Sherman	Massachusetts.
William H. Spencer	New York.
Oscar Herbert Stevens	Massachusetts.
William C. Stoddard	Rhode Island.
Leslie Mitchell Swett	Massachusetts.

CHICAGO COLLEGE OF DENTAL SURGERY.

THE third annual commencement exercises of the Chicago College of Dental Surgery took place at Hershey Music Hall, Chicago, Ill., on Friday evening, March 27, 1885, at 7.30 o'clock. The address to

the graduates was delivered by Prof. W. T. Belfield, M.D.; the valedictory by J. E. Hinkins, D.D.S.

The number of matriculates for the course of 1884–5 was sixty-two.

The degree of D.D.S. was conferred on the following members of the senior class by Dr. J. A. Swasey, president of the board of directors:

NAME.	RESIDENCE.
H. Austin Armitage, M.D.	England.
Harry Leon Barnum, M.D.	Wisconsin.
Edward Everett Cady	Illinois.
Warren Cary, M.D.	Illinois.
Jesse Austin Dunn	Illinois.
Astor Gerard Gray	Illinois.
Rudolph Theodore Hasselriis	Denmark.
Joseph Hickey	Dakota.
John Edward Hinkins	Illinois.
A. Melville Hudson	Canada.
Charles N. Johnson, L.D.S.	Ontario.
William J. Johnson, M.D.	Illinois.
Edmund Lambert	Illinois.
Asa Holt Lane	Illinois.
Charles William Lewis	Illinois.
Archibald S. McCandless	Illinois.
Joseph Donahey Moody	Illinois.
Amos Jedd Nichols	Illinois.
Charles Putnam Pruyn	Illinois.
Joseph J. Reed	Illinois.
Charles Henry Wachter	Maryland.
George W. Whitefield	Illinois.

The honorary degree of D.D.S. was conferred upon Dr. E. B. Call, of Peoria, Ill.

EDITORIAL.

KANSAS DENTAL LAW.

The following is the text of an "Act to regulate the practice of dentistry and punish violators thereof," which has recently passed the Legislature of the State of Kansas and become a law:

Be it enacted by the Legislature of the State of Kansas:

Section 1. That it shall be unlawful for any person to practice, or attempt to practice, dentistry or dental surgery in the State of Kansas, without having first received a diploma from the faculty of some reputable dental college, school, or university department, duly authorized by the laws of this State or some other of the United States, or by the laws of some foreign government, and in which college, school, or university department there was, at the time of the issuance of such diploma, annually delivered a full course of lectures and instructions in dentistry or dental surgery: *Provided*, That nothing in section 1 of this act shall apply to any person engaged in the practice of dentistry or dental surgery in this State at the time of the passage of this act, except as hereinafter provided: *And provided further*, That nothing in this act shall be so construed as to prevent physicians, surgeons, or others from extracting teeth.

Sec. 2. A board of examiners, consisting of four practicing dentists, residents of this State, is hereby created, who shall have authority to issue certificates to persons in the practice of dentistry or dental surgery in the State at the time of the passage of this act, and also to decide upon the validity of such diplomas as may be subsequently presented for registration, as hereinafter provided.

Sec. 3. The members of said board shall be appointed by the Governor, and shall serve for a term of four years, excepting that the members of the board first ap-

pointed shall hold their offices as follows: Two for two and two for four years respectively, and until their successors are duly appointed. In case of vacancy occurring in said board, such vacancy shall be filled by appointment by the Governor.

Sec. 4. Said board shall keep a record, in which shall be registered the names and residences or places of business of all persons authorized under this act to practice dentistry or dental surgery in this State. It shall elect one of its members president and one secretary thereof, and it shall meet at least once in each year, and as much oftener and at such times and places as it may deem necessary. A majority of the members of said board shall constitute a quorum, and the proceedings thereof shall be at all times open for public inspection.

Sec. 5. Every person engaged in the practice of dentistry or dental surgery within this State at the time of the passage of this act shall, within six months thereafter, cause his or her name and residence and place of business to be registered with said board of examiners, upon which said board shall issue to such person a certificate duly signed by a majority of the members of said board, and which certificate shall entitle the person to whom it is issued to all the rights and privileges set forth in section 1 of this act.

Sec. 6. Any person desiring to commence the practice of dentistry or dental surgery within this State after the passage of this act shall, before commencing such practice, file for record in a book kept for such purpose with said board of examiners his or her diploma, or a duly authenticated copy thereof, the validity of which said board shall have power to determine. If accepted, said board shall issue to the person holding such diploma a certificate duly signed by all or a majority of the members of said board, and which certificate shall entitle the person to whom it is issued to all the rights and privileges set forth in section 1 of this act.

Sec. 7. To provide for the proper and effective enforcement of this act, said board of examiners shall be entitled to the following fees, to wit: For each certificate issued to persons engaged in practice in this State at the time of the passage of this act, the sum of three dollars. For each certificate issued to persons not engaged in the practice of dentistry in the State at the time of the passage of this act, the sum of ten dollars.

Sec. 8. The members of said board shall each receive the compensation of five dollars per day for each day actually engaged in the duties of their office, which, together with all other legitimate expenses incurred in the performance of such duties, shall be paid from fees received by the board under the provisions of this act, and no part of the expenses of said board shall at any time be paid out of the State treasury. All moneys in excess of said *per diem* allowance, and other expenses, shall be held by the secretary of said board as a special fund for meeting the expenses of said board, he giving such bond as the board shall from time to time direct, and such board shall make an annual report of its proceedings to the Governor by the fifteenth day of December of each year, together with an account of all moneys received and disbursed by them in pursuance of this act.

Sec. 9. Any person who shall violate this act by practicing or attempting to practice dentistry within the State without first complying with the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in a sum not less than ten dollars nor more than one hundred dollars.

Sec. 10. This act shall take effect and be in force from and after its publication in the statutes.

DAKOTA DENTAL LAW.

THE following is the text of an "Act to insure the better education of practitioners of dental surgery and to regulate the practice of dentistry in the Territory of Dakota:"

Be it enacted by the Legislative Assembly of the Territory of Dakota:

SECTION 1. That it shall be unlawful for any person to engage in the practice of dentistry in this Territory unless he or she shall have obtained a certificate, as hereinafter provided.

SEC. 2. A board of examiners, to consist of five practicing dentists, is hereby created, whose duty it shall be to carry out the purposes and enforee the provisions of this act. The members of said board shall be appointed by the governor, who shall select them from ten candidates, whose names shall be furnished him by the South Dakota Dental Society and the Northwestern Dental Association; each shall furnish the names of five candidates, and the governor shall select at least two from each five names so furnished to be members of said board. The term for which the members of said board shall hold their offices shall be five years, except that the members of the board first to be appointed under this act shall hold their offices for the term of one, two, three, four, and five years respectively, and until their successors shall be duly appointed. In case of a vacancy occurring in said board, such vacancy shall be filled by the governor from names presented to him by the Northwestern Dental Association and the South Dakota Dental Society. It shall be the duty of said dental organizations to present twice the number of names to the governor of those to be appointed.

SEC. 3. Said board shall choose one of its members president, and one the secretary thereof, and it shall meet at least once in each year, and as much oftener, and at such times and places, as it may deem necessary. A majority of said board shall at all times constitute a quorum, and the proceedings thereof shall at all reasonable times be open to public inspection.

SEC. 4. Within six months from the time this act takes effect, it shall be the duty of every person who is at that time engaged in the practice of dentistry in this Territory to cause his or her name and residence or place of business to be registered with said board of examiners, who shall keep a book for that purpose.

The statement of every such person shall be verified under oath, before a notary public or justice of the peace, in such a manner as may be prescribed by the board of examiners.

Every person who shall so register with said board, as a practitioner of dentistry, may continue to practice the same as such, without incurring any of the liabilities or penalties provided in this act, and shall pay to the board of examiners for such registration a fee of one dollar.

It shall be the duty of the board of examiners to forward to the register of deeds of each county in the Territory a certified list of the names of all persons residing in the county who have registered in accordance with the provisions of this act; and it shall be the duty of all registers of deeds to register such names in a book to be kept for that purpose.

SEC. 5. Any and all persons who shall so desire may appear before said board at any of its regular meetings, and be examined with reference to their knowledge and skill in dental surgery; and if the examination of any such person or persons shall prove satisfactory to said board, the board of examiners shall issue to such persons as they shall find to possess the requisite qualifications a certificate to that effect, in accordance with the provisions of this act; said board shall also indorse

as satisfactory diplomas from any reputable dental college, when satisfied with the character of such institution, upon the holder of such diploma furnishing evidence, satisfactory to the board, of his or her right to the same.

All certificates issued by said board shall be signed by its officers, and such certificate shall be prima facie evidence of the right of the holder to practice dentistry in the Territory of Dakota.

SEC. 6. Any person who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction may be fined not less than fifty dollars nor more than one hundred dollars, or be confined six months in the county jail.

All fines received under this act shall be paid into the common school fund of the county in which such conviction takes place.

SEC. 7. In order to provide the means for carrying out and maintaining the provisions of this act, the said board of examiners may charge each person applying to or appearing before them for examination for a certificate of qualification a fee of ten dollars, which fee shall in no case be returned; and out of the funds coming into the possession of the board, from the fees so charged, the members of said board may receive, as compensation, the sum of five dollars for each day actually engaged in the duties of their office, and all legitimate and necessary expenses incurred in attending the meetings of said board; said expenses shall be paid from the fees and penalties received by the board under the provisions of this act, and no part of the salary or other expenses of the board shall ever be paid out of the Territorial treasury.

All moneys received in excess of said per diem allowance and other expenses, as above provided for, shall be held by the secretary of said board as a special fund for meeting expenses of said board and carrying out the provisions of this act, he giving such bonds as the board shall from time to time direct.

And said board shall make an annual report of its proceedings to the governor, by the 15th of December of each year, together with an account of all moneys received and disbursed by them pursuant to this act.

SEC. 8. Any person who shall receive a certificate of qualification from said board shall cause his or her certificate to be registered with the register of deeds of any county in which such person may desire to engage in the practice of dentistry, and the registers of deeds of the several counties in this Territory shall charge for registering such certificates a fee of twenty-five cents for such registration.

Any failure, neglect, or refusal on the part of any person holding such certificate to register the same with the register of deeds, as above directed, for a period of six months, shall work a forfeiture of the certificate, and no certificate when once forfeited shall be restored, except upon the payment to said board of examiners of the sum of twenty-five dollars as a penalty for such neglect, failure, or refusal.

SEC. 8. Any person who shall knowingly and falsely claim or pretend to have or hold a certificate of license, diploma, or degree granted by any society, or who shall falsely, and with intent to deceive the public, claim or pretend to be a graduate from any incorporated dental college, not being such graduate, shall be deemed guilty of a misdemeanor, and shall be liable to the same penalty as provided in section 6 of this act.

SEC. 10. This act shall take effect and be in force from and after its passage and approval.

Approved March 10, 1885.

WISCONSIN DENTAL LAW.

The following is the text of an "Act to regulate the practice of dentistry and to establish a State board of dental examiners" in the State of Wisconsin:

The people of the State of Wisconsin, represented in Senate and Assembly, do enact as follows:

Section 1. It shall be unlawful for any person who is not, at the time of the passage of this act, engaged in the practice of dentistry in this State, to commence such practice, unless he shall have obtained a license as hereinafter provided.

Sec. 2. A board of examiners, to consist of five practicing dentists, is hereby created, whose duty it shall be to carry out the purposes and enforce the provisions of this act. The members of said board shall be appointed by the governor. Three members of this board, at least, shall be members of the Wisconsin State Dental Society. The terms for which the members of said board shall hold their offices shall be five years, except that the members of the board first to be appointed under this act shall hold their offices for the terms of one, two, three, four, and five years respectively, and until their successors are appointed and qualified. In case of vacancy occurring in said board such vacancy shall be filled by the governor.

Sec. 3. Said board shall choose one of its members president and one secretary thereof, and it shall meet at least once in each year and as much oftener and at such times and places as it may deem necessary. A majority of said board shall at all meetings constitute a quorum, and the proceedings thereof shall, at all reasonable times, be open to public inspection.

Sec. 4. It shall be the duty of every person who is engaged in the practice of dentistry in this State, within six months from the date of the passage of this act, and annually thereafter, to cause his or her name and residence or place of business to be registered with said board of examiners, who shall keep a book for that purpose; and every person who shall register with said board as a practitioner of dentistry may continue to practice the same as such without incurring any of the liabilities or penalties provided in this act. The board of examiners shall furnish to the county clerks a certified list of those registered, and it shall be the duty of the county clerks to register such names in a book kept for such purpose. Every person registering with the board of examiners shall pay as a fee therefor the sum of one dollar.

Sec. 5. Any and all persons who shall so desire may appear before said board at any of its regular meetings and be examined with reference to their knowledge and skill in dental surgery, and if the examination of any such person or persons shall prove satisfactory to said board, the board of examiners shall issue to such persons as they shall find from such examination to possess the requisite qualifications a license to practice dentistry, in accordance with the provisions of this act. But said board shall at all times issue a license to any regular graduate of any reputable, legally incorporated dental college, which requires that the candidate for graduation shall attend two full courses of lectures of five months each, the last of which shall be attended in the institution granting the diploma, without examination, upon the payment by such graduate to the said board of a fee of one dollar. All licenses issued by said board shall be signed by the members thereof, and be attested by its president and secretary; and such license shall be prima facie evidence of the rights of the holder to practice dentistry in the State of Wisconsin.

SEC. 6. Any person who shall violate any of the provisions of this act shall be liable to prosecution before any court of competent jurisdiction, upon information or by indictment, and upon conviction may be fined not less than fifty dollars nor more than two hundred dollars for each and every offense.

SEC. 7. In order to provide the means for carrying out and maintaining the provisions of this act, the said board of examiners may charge each person applying to or appearing before them for examination for license to practice dentistry a fee of ten dollars. And out of the funds coming into their possession, from the fees mentioned in this act, the members of said board may receive all legitimate and necessary expenses incurred in attending the meetings of said board and in conducting the business thereof. Said expenses shall be paid from the fees received by the board, under the provisions of this act, and no part of the expenses of said board shall be paid out of the State treasury. All moneys received in excess of said expenses, above provided for, shall be held by the secretary of said board as a special fund for meeting the expenses of said board, he giving such bond as the board shall from time to time direct. And said board shall make an annual report of its proceedings to the governor, on the thirtieth day of September in each year, together with an account of all moneys received and disbursed by them pursuant to this act.

SEC. 8. This act shall take effect and be in force from and after its passage and publication.

Approved March 23, 1885.

PERSONAL.

DR. MORDAUNT STEVENS, of Paris, foreign secretary of the Odontological Society of France, requests us to state that the name of the street in which he has so long practiced (the Rue de Luxembourg) has been changed, and is now the Rue Cambon. To avoid delay in delivery, letters and papers for him should be addressed to No. 42 Rue Cambon, près la Madeleine, Paris, France.

BIBLIOGRAPHICAL.

A GUIDE TO THE DISEASES OF CHILDREN. By JAMES FREDERICK GOODHART, M.D., F.R.C.P., assistant physician to Guy's Hospital, etc. Revised and edited by LOUIS STARR, M.D., clinical professor of diseases of children in the Hospital of the University of Pennsylvania, etc. With Formulæ. Pp. 738. Philadelphia: P. Blakiston, Son & Co., 1885. Price, cloth, $3.00; sheep, $4.00.

This volume is intended by the author to occupy the middle ground between the compend and the voluminous text-book; to treat only of the diseases incidental to childhood, or of such features in disease as appear to be peculiar in children.

The author has evidently written from the stand-point of observation and practice, and has condensed into forty-eight chapters a

concise description from clinical experience of the special diseases of infancy and childhood; their morbid anatomy, etiology, and treatment. He gives to proper feeding and hygiene the importance which they deserve, and discourages unnecessary or energetic drugging. Throughout the volume there is considerably more than the average of common-sense shown by the author. The additions of the American editor are judicious and practical.

Insomnia and Other Disorders of Sleep. By Henry M. Lyman, A.M., M.D., professor of physiology and of diseases of the nervous system in Rush Medical College, etc. Small octavo, pp. 239. Chicago: W. T. Keener, 1885.

We have in this volume seven chapters, the subjects of which are as follows: The Nature and Cause of Sleep; Insomnia, or Wakefulness; Remedies for Insomnia; Treatment of Insomnia in Particular Diseases; Dreams; Somnambulism; Artificial Somnambulism, or Hypnotism.

The author has written, with the exception of the last chapter, a sensible and practical little book, containing much valuable information, presented in a clear, terse style. The exception noted is in his acceptance of the theory of transference of cerebral perceptions by certain sensitive persons, by which the phenomenon of so-called mind-reading is explained.

Notes from the Physiological Laboratory of the University of Pennsylvania. Edited by N. A. Randolph, M.D., assistant demonstrator of physiology in the University of Pennsylvania, etc.; and Samuel G. Dixon, assistant demonstrator of physiology at the University of Pennsylvania. Small octavo, pp. 88. Printed by J. B. Lippincott Company, Philadelphia, 1885.

This volume consists of fourteen brief chapters,—the records of facts of interest brought to light in the course of physiological study. The subjects are treated concisely, but apparently with scientific accuracy. Several of the chapters are of special interest in the study of foods with reference to physical development, and are well worthy of consideration from this stand-point. We note as such "A Note on the Fæces of Starch-fed Infants," "A Study of the Nutritive Value of Branny Foods," and "On the Digestion of Raw and of Boiled Milk."

The Medical Directory of Philadelphia, Pennsylvania, Delaware, and the Southern Half of New Jersey, 1885. Philadelphia: P. Blakiston, Son & Co. Price, $2.50.

We have here a list of the physicians of the sections indicated in

the title, with their addresses, college from which they graduated, date of graduation, specialty, if any, and institutions with which they are connected; also, the various organizations, institutions, and State and city matters connected with medicine; laws relating to the practice of medicine and dentistry, and lists of dentists and druggists in the localities mentioned. The information with reference to colleges, hospitals, institutions, and organizations includes all details necessary for a good understanding of each. The volume is well indexed, so that the information sought can be readily obtained. Bound in flexible morocco, gilt-edged,—a sightly volume, and pleasant to handle.

Transactions of the College of Physicians of Philadelphia. Third Series, Vol. VII. Philadelphia: Printed for the College, and for sale by P. Blakiston, Son & Co. 1884.

This is an interesting and valuable volume in the series published by the College of Physicians. It contains memoirs of Dr. Thomas Stewardson, Dr. George Fox, Dr. J. Forsyth Meigs, and Dr. Samuel D. Gross; also, fourteen papers on practical and scientific topics, among which are "Chronic Nasal Catarrh in Children" and "A New Method of Recording the Motions of the Soft Palate," by Harrison Allen, M.D.; and "The Composition and Methods of Analysis of Human Milk," by Professor Albert R. Leeds.

Annuaire Général des Dentistes. Publié sous le patronage de l'Institut Odontotechnique de France, suivi d'un Mémorial Thérapeutique du Médecin-Dentiste. Par le Dr. Andrieu, et augmenté d'un Formulaire du même auteur. 1885–1886. 4e anné. Paris: Aux Bureaux du Secrétariat de l'Institut Odontotechnique de France.

The object of this little annual is amply set forth in the title as above transcribed. The fact that it has reached the fourth year of its publication indicates that it is appreciated in France and the adjacent countries for which it is intended.

Transactions of the American Dental Association, at the Twenty-fourth Annual Session, held at Saratoga Springs, N. Y., commencing on the 5th of August, 1884. Philadelphia: The S. S. White Dental Manufacturing Co., 1885.

No member or friend of this leading American association can complain of a want of care and taste in the make-up and appearance of their annual volume of Transactions for 1884, which is an attractive octavo of 182 pages, making probably the most extended volume yet issued by it. Besides the full report of the regular pro-

ceedings, it contains the "amended Constitution adopted at Saratoga in 1869, with amendments up to and including the session of 1884," and also the Code of Dental Ethics. These, of course, make this issue of the Transactions more than usually valuable. Two beautiful plates accompany and illustrate Dr. Williams's essay on the histology of the teeth.

Pamphlets Received.

Report of Committee on School Hygiene in Tennessee. By Daniel F. Wright, M.D., of Clarksville, Tenn., member of the State Board of Health and chairman of its committee on the subject. Reprinted from the second report of the State Board of Health. January 1, 1885.

Philadelphia Social Science Association: Sanitary Influences of Forest Growth. Read at a meeting of the Association, January 29, 1885, by Dr. J. M. Anders. Reprinted from the Proceedings of the Philadelphia County Medical Society. Published by the Philadelphia Social Science Association.

Experimental Researches on Cicatrization in Blood Vessels after Ligature. By N. Senn, M.D., of Milwaukee, Wis. Extracted from the Transactions of the American Surgical Association, Vol. II., 1884. Philadelphia: Collins, printer, 1885.

Typhoid Fever and Low Water in Wells. By Henry B. Baker, M.D., Lansing, Mich. Reprinted from the annual report of the Michigan State Board of Health for the year 1884. By authority. Lansing: W. S. George & Co., 1885.

"Dental Caries—a Critical Summary," by Henry Sewill, M.R.C.S., L.D.S., Eng. A Review, by F. Searle, D.D.S., Springfield, Mass.

OBITUARY.

R. F. TULL, D.D.S.

Died, in Elkton, Md., April 6, 1885, of typhoid fever, Dr. R. F. Tull, in the thirty-fifth year of his age.

Dr. Tull studied dentistry with Dr. T. H. Musgrove, then of Elkton. He graduated at the Pennsylvania College of Dental Surgery, class of 1871, and located in Elkton in 1872, where he successfully practiced his profession until his decease. He was a young man of more than ordinary ability, an efficient dentist, and much respected in the town where he resided.

PERISCOPE.

Locomotor Ataxia with Loss of Teeth.—The following anomalous case of locomotor ataxia has been under my care for three months in the Episcopal Hospital. The patient is now under the care of Dr. Henry M. Fisher, who courteously allows me to use the notes of the case.

Mr. A., æt. 45, a well-marked ataxic for over five years, presents the following history, some points of which seem well worthy of record. Nasal catarrh exists in several members of the family, including himself. During the war he was wounded in the hip and ankle slightly; the wounds healed kindly. He was confined for some time in Libby and Belle Isle prisons, and since then has never felt strong. He denies having had syphilis. When 39 years of age he began to show the first symptoms of ataxia; these were diplopia, dizziness, and a staggering gait. One and a half years later he began to have lancinating pains in the extremities, and later in the bowels. Five years ago he began to have transient attacks of difficulty of hearing, and this has increased since then until about one year ago, when he became absolutely deaf.

He has always been constipated, and one year ago had slight difficulty in urination. Within the last seven months he has had severe gastric crises. Eyesight good until the last seven or eight months, except during the first year. Four years ago the symptoms for which I present the case to-night first appeared. This was a loosening and a subsequent falling out of the lower wisdom teeth. No pain nor discomfort preceded this, and the teeth were perfectly sound. In fact, he had an uncommonly fine set of teeth. After this his teeth gave him no trouble until about seven months ago, when the same change began in the upper jaw, causing the loss of every tooth except the right first molar, which still remains firm.

The sequence of these events appears to be about as follows: First, the teeth loosen; then the gums recede, showing in places the alveolar processes denuded; the teeth then fall or are pulled out by the fingers, and finally the alveolar processes separate in small fragments, with slight suppuration, or are detached in larger pieces. The gum then heals. The largest piece of bone thus separated shows the sockets of three incisors, and a portion of a fourth. The teeth show no absorption of their fangs, and are almost without exception perfectly sound. About four months elapse between the loosening of a tooth and the final healing of the gum.

Other points of interest in this case are as follows: The patient is extremely pallid; he has the ataxic gait, although this is not very pronounced. He cannot stand with eyes closed. The knee-jerk is absent, and has been for the last four years. There is no anesthesia of the feet or legs, and the patient localizes touch fairly; there is, however, some analgesia. There is no retardation of sensation. Examination of the eyes shows external strabismus of both eyes. Pupils pin-point for near accommodation, and relax for distant vision; no reaction to light. Ophthalmoscopic examination shows left eyeground normal, and but slight atrophy of nasal border of right disk.

His sense of smell and of taste are good. There are no lesions in any of his joints to be detected.—*Dr. Morris J. Lewis, Report Philadelphia Neurological Society, in Medical and Surgical Reporter.*

Commercial Disinfectants.—In a preliminary report of the committee on disinfectants of the American Public Health Association, Dr. George M. Sternberg, U. S. A., gives the result of experimental investigations of the various disinfectants in the market. He claims that many of the so-called disinfectants are of no use as germicides, and that, though there is good authority for calling a substance which will prevent putrefactive decomposition or which will destroy bad odors a disinfectant, yet it should be remembered that a disinfectant from this point of view does not necessarily destroy infectious material. He also claims that as a matter of fact those agents which by laboratory experiments have been proved to be the most potent germicides have, by the experience of sanitarians, been shown to be the most reliable disinfectants. Evidently there can be no partial disinfection; either the infecting power of the material to be disinfected is destroyed or it is not. It is therefore essential that we keep on the safe side in the practical application of those agents which withstand these tests. Dr. Sternberg says: "It is well known that anthrax spores constitute one of the most difficult tests of germicide power. We may safely assume then that an agent which will destroy these spores will also destroy all known disease germs and probably all organisms of this class known or unknown."

The time of exposure to the disinfecting agent in the experiments from which the results are recorded was two hours, and the amount of the solution of the disinfecting agent was equal to the amount of material to be disinfected.

Numerous other experiments were made, but only those are recorded here which fix the limits between success and failure.

In the table (copied from the *Medical News*) the agents are arranged with reference to their relative efficiency.

List of Commercial Disinfectants Tested.

Name upon Label.	Per cent. in which active.	Per cent. in which failed.
Little's Soluble Phenyle (Morris, Little & Co., Brooklyn),	2	1
Labarraque's Solution (*Liq. sodæ chlorinatæ*); name of manufacturer not given, ...	7	5
Liquor Zinci Chloridi (Squibb's), ...	10	7
Feuchtwagner's Disinfectant (L. Feuchtwagner & Co., New York), ...	10	8
Labarraque's Solution (from Freré, Paris), . . .	15	10
Phénol Sodique (Hance Bros. & White, Philadelphia),	15	10
Platt's Chlorides (Henry B. Platt, New York), .	20	15
Girondin Disinfectant (James Meyer, Jr., New York),	25	15
Williamson's Sanitary Fluid (D. D. Williamson, New York), ...	25	20

Name upon Label.	Per cent. in which active.	Per cent. in which failed.
Bromo-chloralum (Bromo-Chemical Co., New York), .	25	20
Blackman Disinfectant (Blackman Disinfectant Co., New York), ...	30	20
Squibb's Solution of Impure Carbolic Acid (about two per cent.), ...		50
Burchardt's Disinfectant (J. H. Harty & Co., New York), ...		50
Phénol Sodique (7 Rue Coq. Héron, Paris), . .		50
Listerine (Lambert & Co., St. Louis), . . .		50

DENTAL LEGISLATION FOR THE DISTRICT OF COLUMBIA.—A bill to regulate the practice of dentistry in the District of Columbia passed the House of Representatives on January 12. It provides for a board of examiners, and requires them to make proper inquiries into the fitness of all who practice dentistry in the District of Columbia; to issue certificates of competency, and to keep a full register of dentists so practicing. Non-compliance with the provisions of the act is made punishable by a fine of not less than fifty dollars, or more than two hundred dollars, in default of the payment of which, imprisonment for not less than thirty days nor more than ninety days. Nothing in the act to be so construed as to prevent surgeons and physicians from extracting teeth and prescribing for or treating diseases of the mouth.—*Med. News.*

HINTS AND QUERIES.

REPLY to F. S. Harris, who asks, in the March number of the DENTAL COSMOS, what causes scars on the palatal surface of vulcanite plates. If he will abandon the *moist* heat process in packing, the little scars will not appear. They are caused by the moisture being converted into steam; hence the scars. To prove it, let him put a few drops of water under the rubber in a test case, and he will have a plate pretty well indented. I have had the same trouble with the same rubber, as well as with other rubbers. I now pack with dry heat, and have no trouble.—W. T. MAGILL, *Rock Island, Ill.*

DR. B. F. ARRINGTON, in an article in the March number of the DENTAL COSMOS, states that he uses sulphuric acid (pure sulphuric) diluted one part to ten or twenty or thirty of water in the treatment of pyorrhea. Sulphuric acid is very corrosive, and is especially so even when diluted to one in thirty, and much more corrosive in the proportion of one in twenty or one in ten. It is not safe practice to use it in such concentrated strength. The dilute acid of the U. S. Pharmacopœia is one in ten, and the dose is from ten to thirty drops largely diluted. The method of treatment proposed must be injurious to the structure of the enamel and cementum, if persisted in for any considerable length of time, and I would caution neophytes to carefully rinse the mouth with lime-water or milk when such treatment is resorted to. In my opinion the acid should be diluted to one in sixty or eighty, and what would be still better—make no use of it at all in the manner proposed.—$H_2 S O_4$.

To the Editor of the Dental Cosmos:

While much pleased with the article on "Gold Crowns," in the February number of the Dental Cosmos, by C. S. Case, I cannot help thinking he scratches his left ear with his right hand, so to speak, in some of his details. If he will get up a few zinc casts of the grinding surfaces of a few typical molars and bicuspids, he can swage up at odd moments out of scraps of 18-carat plate far more artistic cusps than he can get in any other way; or, if its fellow of the opposite side be left, strike up his grinding surface from a model of that; but in such case he must use very thin gold, else it will be too large. Having a piece struck, let him grind it flat on the under side, flow it with good solder, and at his second sitting adjust the ferrule and wax on the struck piece. By suitably grinding off the ferrule he gets an articulation that is perfect; then, after wiring it together, a whiff of the blowpipe completes the crown, except finishing.—Charles J. Rathbun, D.D.S., London, Eng.

In reply to numerous inquiries regarding *Menthol Crystals*, I would say that the daily use, for a long time, of this medicament has established for it great therapeutic value dentally. Dissolved in oily carbolic acid (Merck's Creasote), in proportions of three to five grains to a drachm of acid, it makes one of the most potent pulp-soothers that I have ever used. Made into paste with viscid cosmoline, it is possessed of marked efficacy in quieting peridental irritation in such cases as are *somewhat* relieved by opening into the tooth; used by being placed, from small probes, into the pulp cavity and canals and covered, *not too tightly*, with *dry* pellets of cotton. As an ingredient of "inspissated canal pastes" (for permanent filling of canals), its record is really quite remarkable, as numbers of teeth which have failed to yield to ordinary treatment (acetate of morphia, eucalyptus oil, iodoform paste, etc.) have now remained comfortably "stopped" for varying periods of time ranging from three months to nearly a year.

As an adjunct to oil of cloves ointment, and even to aconitia ointment, results have been eminently satisfactory when used externally in cases of so-called "neuralgia," and in swollen conditions concomitant with alveolar abscess. Ointments are made by spatulating a few crystals of menthol into other ointment mass.

So acceptable in its working, so harmless in its application, and so persistent in its relief to suffering is menthol, that it has become an "accepted" article in my list of materials and a welcome aid to the work of the clinic rooms in the college with which I am connected.—J. Foster Flagg, D.D.S.

To Correct Errors of Articulation in Artificial Dentures.—Where the deficiency in the articulation is at all extensive, it is better to proceed in the following method than by the usual tedious and guess-work way of grinding and articulating in the mouth: Double a sheet of base-plate wax; warm it, and insert it in the mouth, taking the bite. Remove the plate and wax from the mouth, and cement them together. Pour the plaster over the other side of the wax sheet, and at the same time set the whole up in the articulator. The plaster being set, and the wax removed, you can now proceed to grind, seeing clearly what you are about, and obtaining certain results.—Stewart J. Spence, San Francisco.

I offer a suggestion for an improvement in the handle of the hand-mallet. I have had an ordinary magnifying mouth-glass inserted in the handle near its end, which I find very convenient, as it allows me to inspect distal surfaces without having to lay down the mallet and take up a mirror, and without changing my position.—W. C. B.

To the Editor of the Dental Cosmos:

Cocaïne in my hands, as in others', seems to have little effect on sensitive dentine. A four per cent. solution of the powder in deliquesced chloride of zinc has, I think, an effect superior to either alone. This solution when chilled precipitates slender crystals, which are rapidly re-dissolved on warming. It appears to me to very much lessen the usual pain inflicted by the zinc and to produce a more marked result. In obstinate cases I have mixed the salts in the cavities with seemingly greater benefit. I may be deceived, and would like to note the experience of others with this combination.—B. Percival, D.D.S.

It is but repeating history to add to the matter published in the Dental Cosmos for February as to the relation of dead teeth to the eyesight. I furnish the history of a case,—or rather, a chapter in that history,—which is that of a lady whose left eye had given her so much trouble for three years as to lead her to conclude that its days of usefulness were ended. Oculists had vainly sought to remedy the trouble. In five days, however, from the date of the extraction of a defective upper molar and bicuspid on that side, the eye was as well as the other one.—J. B. Hodgkin.

To the Editor of the Dental Cosmos:

I have before me two pamphlets treating of the "Vegetable Anesthetic," discovered, as we are told on the title-page of each, by Dr. U. K. Mayo, April, 1883. One of these pamphlets contains twenty-four pages; the other thirty-two pages,—the latter styled "second edition." The increase in the number of pages in the second edition gives opportunity for various additions to the first, probably the most curious of which is shown in the following statements of the same case by the same surgeon, both bearing the same date. The history given in the first edition is as follows:

"*Statement of Dr. Thorndike.*

"Boston, August 15, 1883.—This certifies that I removed from the back of Mr. J. B. Moore a tumor weighing two pounds and three-quarters. It was situated over the left scapula. The time occupied in removing it and in dressing the wound was twenty-two minutes. The patient was insensible during the whole operation, and came out from the influence of the anesthetic speedily and perfectly, without nausea or any ill effects. The agent used was prepared by Dr. Mayo, the dentist, who claims that it is a new discovery of his own.

"Wm. H. Thorndike, M.D., 92 Boylston street."

The history given in the second edition reads as follows,—the principal difference being the addition of the last sentence:

"*Statement of Dr. Thorndike.*

"Boston, August 15, 1883.—This certifies that I removed in the back of Mr. J. D. Moore a tumor weighing two pounds and three-quarters. It was situated over the left scapula. The time occupied in removing it and in dressing the wound was twenty-two minutes. The patient was insensible during the whole operation, and came out from the influence of the anesthetic speedily and perfectly, without nausea or any ill effects. The agent used was prepared by Dr. U. K. Mayo, the dentist, who claims that it is a new discovery of his own. *I consider this anesthetic the safest the world has yet seen.*

"Wm. H. Thorndike, M. D., 92 Boylston street."

It will be seen that the certificate as printed in the first edition is a simple

statement of an occurrence, while in the second the eminent surgeon is made to give his unqualified indorsement of an agent for the production of anesthesia which, on the previous page of the pamphlet, we are told he was "wholly unacquainted with, never having seen it inhaled by anyone." One ceases to wonder, however, that so eminent a surgeon should have made so reckless a statement in regard to a single experiment with an unknown agent. But it is a fact which is entitled to its full value that when the *second* edition was published Dr. Thorndike was no longer among the living. Comment is unnecessary.—X.

Too Much "Novelty."—Is there not too much hankering after "something new" among our leading men, and in the discussions of our societies? I do not mean that "nothing new" should become the rule of our meetings; but it strikes me that most of us aim to astonish by some new suggestion or conceit, and think, because it is "new," that it is valuable. Anyone who looks over the files of our journals or the transactions of our societies will be surprised to find how many ideas that were startling at the time are now entombed, and how much nonsense was "relished by the wisest men."

To my mind, this hunger after "new ideas" from every writer and every contributor is not a good indication. It is a feverish and unhealthy sign, and tends to superficial study, as well as work. It often occurs to me that it would do us good, even in this progressive age, to discuss exploded theories out of which grew the truth we possess; that we would profit by recalling how much was done for us by our pioneers, and why it was that their operations were so successful, notwithstanding the obstacles they had to contend with. One who walks through a dental depot to-day, and observes the improved devices made to ease our labor ought to pause and wonder how the fathers of dentistry got on without all these appliances and improvements, and ought, too, to thank his stars that he lives in this age.

Just now we are being inundated with a host of new "theories" and new ideas, one clashing with the other, and some directly opposed to each other. Every one of us aspires to tell a new story or show a new surprise, and for the one good story and the one real surprise there are a hundred stupid and ridiculous suggestions. Some one may say now, "Why, it is only by trying new things that we improve." But I hope I shall not be misunderstood. No one that I know of pays more to try everything new than I do. No one that I know of longs more for new ideas than I do. But it would do us all good if we would remember that it is better to give our young men solid principles of practice founded upon experience than sensational hypotheses and speculative nonsense founded upon nothing but personal love for passing notoriety. If our critics would help us to appreciate the value of things known to have been tried and worthy to be trusted, and place a premium upon the repetition of lessons that may be familiar but which are known to be reliable, it would be a boon to seekers after truth. Perhaps in Europe they go too slow; but in America we go too fast. It is better to "make haste slowly;" better to follow the poet's advice:

> "Be not the first to lay the old aside,
> Nor yet the first by whom the new is tried."

There is too much encouragement given to "cranky" ideas and to the dissemination and discussion of superficial investigation. Mere statement is too often accepted as "proof," and we are apt to unlearn the knowledge we have in *rushing* after an *ignis fatuus* that looks like knowledge. Let us keep cool.—H. Y. T.

THE

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ORIGINAL COMMUNICATIONS.

EXPERIMENTS WITH THE NEW ANESTHETIC, HYDROCHLORATE OF COCAÏNE.

BY ALTON HOWARD THOMPSON, D.D.S., TOPEKA, KANSAS.

(Read before the Kansas State Dental Association, at Topeka, May 7, 1885.)

A much-vaunted new remedy or method is an aversion and an abomination to the conservative practitioner of any branch of the healing art. He sees new drugs brought out almost daily, which are heralded throughout the land as being absolute specifics, supported by a long list of recommendations, founded upon a few trifling and inconclusive experiments or clinical observations. Some of these remedies have a degree of popularity, a few have a decided "run," and a very few have merit sufficient to place them in the Pharmacopœia as having a distinct value, but the vast majority have but an ephemeral existence, and soon pass to the realm of things forgotten as being absolutely worthless.

So it transpires that when a new method or remedy is announced, or a new use is found for an old one, which is declared to be the greatest specific ever discovered for the treatment of one or many diseases, the conservative man merely remarks that the claims are too good to be true, and passes it by. He knows that if it has half the merit claimed for it he will hear of it again, and can then use it, but that the chances are that it is like the thousands gone before which merited the oblivion they attained. Yet he knows, too, that occasionally a new remedy or method is introduced which, after critical experimentation, makes a place for itself in his *répertoire* as being really valuable and possessing definite powers which are to be relied upon. Such remedies are positive, and their use marks a step in advance in the line of progress.

Such a remedy is the *hydrochlorate of cocaïne*, whose advent has

been phenomenal and nothing less. It has been many years since a new remedy has made such a sweeping conquest of the medical profession and of its surgical specialties.

Within two months after its anesthetic effects were first discovered it was in extensive clinical employment in all the surgical specialties,—the dental not being behindhand in testing its wonderful properties upon the teeth, to the end of banishing, if possible, that great terror, pain, from the popular apprehension in regard to dental operations. Since its introduction the reports of experiments and studies of the drug have become voluminous, and overshadow everything else in recent literature. Its qualities seem to be so wonderful that, even with the crude methods necessarily attending primary experimentation, the results are little short of marvelous. On account of its positive anesthetic effects it already has a permanent place in surgical therapeutics, and with the development of its capabilities it will doubtless demonstrate that it is the greatest discovery since that of general anesthesia, and, like that, will be an inestimable boon to suffering humanity.

We seem to be but upon the threshold of its possibilities, and now are most in need of improvements in the methods of its application, that we may meet the demands of painful operations of all kinds in practice. We do not yet know the proper proportions of hydrochlorate to employ in any given class of cases, nor the vehicle for conveying it, nor the proper method of application. But we are progressing toward that better knowledge of the drug which extended observations from clinical experiments empirically prosecuted will yield us. In the meantime we have but to do the best we can with the knowledge we have, and carefully note results. The promises it holds out, from our limited knowledge of the drug, are unparalleled in the history of therapeutics.

Local anesthesia, complete and positive, is the great need of modern surgery,—something by which pain may be avoided and sensation for the time be held in abeyance in the parts to be operated upon. Such a substance would be humanitarian in the highest degree, and would save untold suffering. In our own profession, for instance, the aggregate of pain which we are called upon to inflict from day to day is something appalling; but add to this the mental anguish which the anticipation of that pain occasions, and we may lay claim to the doubtful honor of occasioning more real suffering than all the other surgical specialties combined. Of what great, inestimable value would a reliable local anesthetic be to us, with which we could prevent, or even nearly prevent, pain, and thereby avoid not that only, but also the perhaps greater suffering of mental anguish from the anticipation of pain.

In addition to that, there would be the escape from the tyranny of the general anesthetics. These not only weigh upon the sensibilities, but squander the time of those of us who cannot yet afford to banish prosthesis from our practice. What would we not give to escape the horrors of chloroform and ether, or the only less disagreeable because less dangerous nitrous oxide! To be relieved of all these by an effective local anesthetic, which could be used in extraction, would lift a gloom from our daily lives, and, by relieving us of the strain of mental anxiety each performance subjects us to, add to the length of our years. Such a boon has been the prayer and wish of the surgical specialties for many years.

Then, again, with such a desideratum attained, the efficiency, success, and usefulness of all branches of surgery would be extended and amplified. Relieved from the anxiety, care, and inconvenience of the general anesthetics, as well as from the hindering effects of the infliction of pain, the surgeon could give all his attention and thought to the performance of the operation. The patient, being conscious, could coöperate in many ways to the advantage of the operation and the assistance of the surgeon. Then the ambitious surgeon could advance to higher fields of usefulness, alleviate more suffering and misfortune, and save and bless more lives. All this and more would come from the ideal local anesthetic.

The introduction of the *hydrochlorate of cocaïne* brought to our notice a remedy which promised much in the direction of the greatly desired agent. Before it could be abused by the quacks and patent medicine men, it was in the hands of the great specialists and tested in various ways in operations upon the eyes, ears, nose, and throat, in most of which it admirably performed its part. Their recommendations brought it to the notice of the rank and file, and in a brief period, as soon as it could be procured, thousands of aurists, ophthalmologists, and dentists were testing it in all operations where the known methods of its application would permit of its employment.

About three months since the writer, not wishing to be out of the fashion, but not having faith in all the claims put forth for it, procured some of the drug and proceeded to conduct clinical experiments. The preparations employed were the two per cent. aqueous solution first, then the four per cent. and the crystals, and later the five per cent. oleate. The results will be best understood by the following reports of experimental cases, taken as they occurred, every case where it was used being reported:

1. First case, two per cent. applied to sensitive cavities for a few minutes; results, *nil*.

2. Young woman; cavities on approximal surfaces of upper bicus-

pids; had been filled with zinc phosphate for some weeks (as is the writer's custom), to allay sensitiveness, but still painful; two per cent. applied for ten minutes; some relief; adjusted dam and reapplied for ten minutes more; pain nearly all gone; prepared and filled; two per cent. seemed too weak.

3. Woman, aged thirty-five; weak from recent confinement, and now nursing. Sensitive approximal cavity on upper cuspid, caused by friction of partial denture; a most sensitive kind of cavity; could not be touched; two per cent. applied and no result; then applied crystals, kept moist, which caused some pain at first; tried in ten minutes, and still painful; moistened again, and in twenty minutes excavated, with very little pain. Such a cavity for such a patient it would have been impossible to excavate without the cocaïne.

4. Woman, aged sixty; extraction. First lower bicuspid with chronic abscess, loose, gum swollen and painful; applied two per cent. for five minutes; very little pain in extracting.

5. Woman, aged twenty-five; sthenic and weak; sensitive cavity on mesial surface of lower first molar; had had phosphate cement filling for some weeks, but still painful; two per cent. for five minutes, with benefit; then four per cent. for ten minutes rendered it nearly insensible; cavity also in grinding face of upper third molar; two per cent. for five minutes, benefited; four per cent. for twenty minutes, quieted.

6. Woman, aged thirty; small and frail; extraction of three upper bicuspids; applied and re-applied two per cent. in all about thirty minutes; very little effect, except to render the gum somewhat insensible.

7. Woman; extraction of upper bicuspid; applied two per cent. for twenty minutes; no effect.

8. Woman, aged thirty, invalid; sensitive cavity in cuspid; four per cent. for fifteen minutes, and upon gum also, with but little effect.

9. Woman, aged forty; sensitive cavity in upper central; had been filled with phosphate for five weeks, and still painful; four per cent. for five minutes, crystals for ten minutes; sensation nearly banished; cavity prepared with comfort.

10. Woman, aged twenty-eight; nervous; sensitive cavity on buccal surface of upper bicuspid; four per cent. applied for twenty minutes; no effect.

11. Man, aged forty; strong and vigorous; sensitive cavity on distal surface of lower molar; phosphate for six weeks; repeated for four weeks, and still sensitive; applied four per cent. for thirty minutes; pain allayed and barely perceptible on preparation.

12. Woman, aged thirty-five; opening chronic alveolar abscess

externally over upper bicuspid; injected two per cent. at intervals of five minutes and waited ten minutes; no sensation in superficial parts; very little in deeper portions.

13. Woman, aged sixty; sensitive cavities on facing approximal surfaces of upper bicuspids; four per cent. for thirty minutes; sensation entirely banished in cavities and gums.

14. Woman, aged forty; sensitive cavity in lower bicuspid; four per cent. for thirty minutes; sensation banished. Cavity in mesial surface of upper central; four per cent. for ten minutes; sensation banished.

15. Man, aged sixty-five; extraction of root of upper cuspid; chronic ulceration, hypertrophy and inflammation of gum; very painful; injected two per cent. about it; repeated in twenty minutes, and operated in twenty minutes; no sensation in lancing or adjusting forceps, but pain in detaching from deeper portions.

16. Woman, aged forty; sensitive cavity on buccal surface of lower molar; had had phosphate for some weeks, and still very painful; four per cent. for five minutes, and no effect.

17. Woman, aged thirty-five; nursing; sensitive cavities on facing approximal surfaces of upper lateral and central; phosphate for some weeks, with little effect; four per cent. for fifteen minutes; repeated in fifteen minutes; very slight benefit; refilled with cement. At sitting a week subsequently applied five per cent. oleate for forty minutes; sensation nearly banished; re-applied four per cent. for twenty minutes more, and completely quieted; while filling one cavity sensation returned to other, and felt cold air.

18. Woman, aged forty; sensitive cavity in central; four per cent. for ten minutes; no effect.

19. Same patient as in No. 12; sensitive cavity on cervix of upper molar; phosphate filling for weeks; still sensitive; four per cent. for forty minutes; reduced to a slight sensation; prepared and filled with comfort. Cavity on mesial cervix of another upper molar; four per cent. for thirty minutes; no effect.

20. Man, aged twenty-five; sensitive cavity in upper cuspid, distal surface; phosphate for weeks and yet painful; four per cent. for fifty minutes; no sensation on preparation and filling; at another sitting the two per cent. was applied to cavities in lower bicuspid, with no effect.

21. Woman, aged thirty; sensitive cavity in upper molar; four per cent. for twenty minutes; no effect.

22. Woman, aged thirty; nursing and anemic; lower first molar ulcerating; disease of long standing, and tooth refused to submit to treatment; tooth aching and painful; injected two per cent. about tooth in gum around root on both sides of alveolus; in ten minutes repeated; in fifteen minutes extracted, with little pain.

23. Woman, aged twenty-three; teeth dwarfed and eroded; sensitive cavity on distal of lower cuspid; treating with phosphate for months, with little effect; applied four per cent. for fifteen minutes, no effect; fifteen minutes more, slight effect; fifteen minutes more, very little more effect; other cavities in same denture treated with little or no success.

24. Woman, aged fifty; adjusting crown to upper cuspid; having had ligature about root, gum was well pushed away; applied four per cent. on rope of cotton for twenty minutes; rendered adjustment of crown comparatively painless, but sensation returned before completion of operation.

25. Man, aged twenty-five; sensitive cavity in distal surface of lower bicuspid; oleate, five per cent., for ten minutes; no effect.

26. Woman, aged thirty-five; extraction of eight anterior upper teeth and roots; teeth protrusive from slow advancement forwards and downwards, so that only small portions of the roots were really embraced by the bone; some of the roots were ulcerated; injected two per cent. in the gums about the teeth and over the roots, and in twenty minutes removed with very little pain; patient described the feeling as one of gradual and extreme "numbness" in the gums, and also in the lip, which was touched by the surplus. The pain of extraction was reduced at least four-fifths, and was indeed very slight. But the case was favorable, as the roots were not imbedded deeply in the bone.

27. Man, aged twenty-five; sensitive cavities in lower lateral and cuspid; two per cent. for ten minutes, with slight effect; five per cent. oleate for ten minutes, with no effect.

From this series of experiments, and from the reported observations of others, we may be able to deduce some conclusions as to the value and peculiarities of the drug as a local anesthetic. We can safely say, for instance, that it is the most positive local anesthetic yet discovered. In the soft tissues it is more reliable than in the osseous, and will there produce insensibility in the majority of cases. In the soft tissues it is only, in fact, a question of saturation. If a part can be reached it can be affected. Even in this it is a great blessing, for the range of its application is almost limitless in minor surgery.

In the osseous and dental tissues its effects are not so positive and reliable as in the softer tissues. In the latter its use is now scientific, while in the former it is yet empirical; anesthetic effects cannot yet be produced with certainty. This is owing, of course, to the difficulty of producing saturation,—the great essential in the process of inducing insensibility. Without saturation sensation cannot be suspended, and that is difficult to induce in the osseous and dental tissues.

But in the treatment of sensitive dentine, with our yet imperfect modes of employing it, it is the most generally reliable obtundent we have so far obtained. It will, with careful application, repeated and persisted in, suspend sensation in the majority of cavities. Even in the most obstinate cases a large per cent. can be overcome by persistent application, but with much expenditure of time and patience.

It does not appear that temperament or age has much to do with the influence of the drug. It would seem that, depending as it does upon absorption by the dentinal fluids for its effects,—the literal benumbing of the protoplasmic contents of the tubuli,—the ratio of its effects would be in direct proportion to the density of the dental tissues of age or temperament,—*i. e.*, other things being equal, that the softer tissues of youth, or poorly constructed teeth, would be more readily affected than the teeth of age or robust organizations. Such does not, however, appear to be the case. At the start it appeared that the cocaïne would be of use in the teeth of the young, but not of the aged; indeed, it might be especially useful in the teeth of children, in which capacity we did not test it; but, contrary to our expectations, the sensitiveness of the teeth of the aged was quite as easily, if not more readily, affected than in the case of the young. It might be due to the grade of vital resistance, its effects being toxic, and the more vigorous the organization the less readily it could be influenced, and *vice versa.*

Following out this suggestion, we found indeed that the teeth of pregnant and nursing women succumbed very readily to the drug. Perhaps this was due to less vitality, or to less density of the dentine, or both; but, as the effect is a fact, it is fortunate, for teeth of this class are frequently difficult to treat,—pain being, indeed, often quite inadmissible.

As to positions, it seemed that cavities upon the buccal and labial faces of the teeth were the most difficult to treat. Sensitive cavities of this class are always the most obstinate, and in the writer's experience only succumb to protracted and repeated treatment with the phosphates. It is not surprising, therefore, that they resisted the cocaïne. If change of methods would enable us to use the drug successfully in these cavities, it would be a blessing indeed.

In the treatment of exposed or congested pulps, or of cavities whose size and proximity to the pulp would warn us to treat and fill temporarily until health is restored, the new anesthetic will be of little use. The dangers of congestion will be but little lessened by its application, and time and probation will be indicated, at any rate.

In regard to methods of application, it seemed from these experiments that the drug must be introduced moist, and be kept moist, in

order to obtain its effects. Moisture is necessary to its absorption, for the fluids containing the cocaïne must be taken up by osmotic action by the contents of the tubuli. For this reason it is better to apply it and give it the time requisite before the rubber-dam is applied. We read of experiments where the dam was adjusted, the cavity carefully dried with hot air, and the solution applied with no effect. Of course it failed, because the fluid soon dried and the drug became inert. The dry dentine absorbed a proportion, but not sufficient to obtain the toxic, benumbing effect necessary to insensibility. Therefore, it is necessary to apply it moist, and the best time is before the application of the dam. Re-application being necessary every few minutes, nothing is lost by solution in the saliva, but considerable advantage is gained by the cotton being kept moist. By thus applying it other operations can be proceeded with in the same mouth.

It seems that the procedure most successful and satisfactory is about as follows: Apply the four per cent. or five per cent. for twenty minutes. If not quiet, re-apply for the same time, and repeat, if not conquered. If not insensible then, or nearly so, re-apply for the same time, and repeat as often as may be necessary. If, after repeated applications, the pain cannot be controlled, you will, of course, acknowledge defeat. But there are very few cases which four or five applications of twenty minutes each will not conquer; usually two or three will suffice. The time required to wait must be utilized upon other operations in the same denture or for other patients. This time necessary to secure its effects is the great drawback to the employment of the cocaïne, and will require us to re-arrange our method of appointments. It is, under our present system, the great impediment in the way of its universal use, and an objection which as yet we cannot overcome. At present, if we cannot employ the time on other operations in the same denture, or upon other patients, it is a dead loss. and costs more than the effect of the cocaïne is worth. Our minutes are literally golden, and our time in hours the greatest expense we have, and we can ill afford to wait half an hour or more for an obtundent to take effect. Besides, every hour in the day has its appointed work, which cannot be deferred because a cavity happens to be unexpectedly sensitive. This is a matter that yet remains to be provided for, and until the methods are improved to shorten the time required, or our system re-organized, the new anesthetic is impracticable in every-day work. It is better for our time to continue the practice of inserting temporary fillings for sensitiveness, and dismissing the patient until another sitting.

Except for the time required to secure its effects, cocaïne will be-

come to us a very useful remedy, and it will retain its place in our cabinets for the occasional employment where the favorable disposition of our time will allow us to use it in sensitive cavities.

In extracting it does not, as yet, seem to be of much value. By copious application to the gum, as well as injecting it around the tooth beneath the gum to reach the pericementum, and over the roots, inside and out, in the hope of its being carried by the circulation to the parts beneath, some reduction of sensibility can be attained, but not sufficient to render its use any way reliable. The superficial parts can usually be made insensible, which is often desirable, but the agony of the dislocation cannot be reached by it. Hence its use in extraction is limited.

The operation of injecting at the foramina of the dental nerves was not experimented with by the writer. It seems to be a perilous operation, and is necessarily impracticable and uncertain. The effects being uncertain, the risks encountered do not warrant its constant use. The great danger from this operation is that injury may be inflicted upon the nerve-trunk, either by the needle or the injection, and permanent paralysis ensue. With this possibility staring us in the face, we may well consider the propriety of attempting that operation at all, and of giving preference to the general anesthetics for extensive operations of extracting. For simple sensitiveness of cavities, it is an unmitigated folly to run the risk of paralysis for the alleviation of pain which can be overcome in other ways. Being impracticable and dangerous in skillful hands, it should not be attempted by the ordinary practitioner.

In conclusion, we may safely say that we have, in the hydrochlorate of cocaïne, a very useful addition to our pharmacopœia. Its use is limited, at present, by the imperfection of the methods we employ, and by our insufficient knowledge of its properties and powers. When these have been improved, as they should and must be, we can accomplish much in alleviating the pain incident to dental operations, and, perhaps, dispel some of the terror with which our ministrations are viewed.

THE CLINICAL SIGNIFICANCE OF RECESSION OF THE GUM.

BY HARRISON ALLEN, M. D., PHILADELPHIA, PA.

The recession of the gum from the necks of the teeth has been studied, so far as I know, as a phenomenon entirely distinct from those changes of a morbid character which occur on other portions of the mucous membrane lining the mouth, the nose, and the throat. I will attempt, in this communication, to trace the connections which may be assumed to exist between the gums and the membranes with which they are continuous.

The first instance of recession of the gum which came under my notice was in 1879, when a gentleman, aged thirty-six, who was suffering from a serpiginous ulcer in the roof of the mouth, and who had also had an abscess in the right maxillary sinus, requested an opinion as to the nature of the palatal lesion. I believed the ulcer to be of syphilitic origin, since he gave a history of synovitis, with recurrences for three years succeeding the first attack, in the shoulders, the knees, and the toes. He denied, however, the specific nature of his complaint, and declared the arthritic complications to be gouty. Evidences of chronic pharyngitis were conspicuous; the pharynx was of small calibre, exhibited infiltrated walls, and the uvula was large and edematous. The recession of the gums from all the teeth was strikingly shown. The patient was the brother of a well-known dental practitioner, who pronounced this condition pyorrhea alveolaris. The disease was thus found associated with chronic pharyngitis, ulceration of the hard palate, and a constitutional state which was certainly either syphilitic or gouty.

The next case came under my care in December, 1883. A gentleman, aged thirty, reported for the relief of so-called chronic pharyngitis. He acknowledged having been a masturbator for many years. He had suffered from spermatorrhea, and for the last ten years from a constant disposition to hack. He referred a peculiar sense of dryness and thirst to the region of the pharynx. Moderate epistaxis existed, yet the patient did not complain of the ordinary symptoms of catarrh. The gums were everywhere of a peculiar white, macerated appearance, and were markedly retracted from the necks of the teeth, so that the cementum of each root was exposed fully a line in height from the enamel to the beginning of the gum. There was no purulent discharge noticed, yet, when the patient was referred to Dr. E. C. Kirk, the diagnosis was made of pyorrhea alveolaris. In this case the roof of the mouth exhibited in the interval between the teeth and the region occupied by the rugæ a broad, uniformly flat surface, the crescentic marks, which in the normal hard palate correspond to the palatal aspects of the several teeth, being entirely absent. The rugæ were crowded together, and presented a peculiar lumpish appearance. Associated with the dental condition were the ordinary evidences of chronic nasal catarrh, notwithstanding the curious fact that all the symptoms were referred by the patient to the pharynx.

In a third instance, a gentleman aged forty, who had contracted the habit of masturbation in youth, but had long since abandoned it; who had been married about ten years and was the father of a healthy child, was referred to me by Dr. S. Weir Mitchell for an opinion respecting the nature of a pharyngeal distress, which consisted in

constant hacking and a sense of fullness referred to the region above the palate and associated in the mind of the patient with a constant disposition of mucus to collect at that point and to fall to the lower part of the throat. The appearances described in the preceding case of the hard palate and the necks of the teeth were very conspicuous. Pyorrhea alveolaris was undoubtedly present.

The fourth case, a gentleman thirty years of age, exhibited the characteristic features of lupus of the throat. This condition was of fourteen years' duration, and was associated with marked atrophy of the turbinated bones and with all the characteristic signs of pyorrhea.

The fifth instance was a gentleman twenty-nine years of age, who for ten years had complained of hoarseness and a disposition to hack, excited heart, and impaired circulation. There was an acknowledgment of the habit of masturbation, which lasted for three years during early manhood. The prepuce was tight, the glands macerated, and the bladder irritable. He had undoubtedly recession of the gums from the upper and lower incisors and the upper bicuspids. There was an unusually large amount of tartar collected on the lingual surface of the lower incisors.

Remarks.—In the five cases described, it is noted that all were males, and, with the exception of the case last mentioned, they were all in middle life. The local lesion of the gums corresponded to those referred to pyorrhea alveolaris. In two of the instances named, at least, this diagnosis was confirmed by dental practitioners. It would appear to be more than a coincidence that in all the five cases, which includes the entire number of examples of recession of the gum which have come under my notice, some constitutional depressing condition existed. The list embraces one case of syphilis or gout; three of spermatorrhea, and one of lupus. So far as I know the association of pyorrhea with any of these affections has never been noted. That all these patients should have had catarrh or troubles referable to the pharynx may be a coincidence, yet this is by no means probable. Prof. E. T. Darby has informed the writer that he has in several instances detected the evidences of catarrh in patients reporting to him for treatment of pyorrhea.

The association of catarrhal states with recession of the gums would point to the conclusion that such catarrhal disposition would be atrophic in character rather than hypertrophic, and would lead the observer further to the conclusion that a disposition to atrophy of the gum need not be a local dyscrasia, but may be simply the most superficial lesion of a group of lesions which may be spread over the mucous membrane of both nasal chambers and even of the throat.

Many observations of interest might be made upon the palatal rugæ and the gums. In hypertrophy of the gums the rugæ are apt to be unusually pronounced. In the person exhibited as Krao, who is an example of hypertrichosis, the anterior group of rugæ are of enormous size. I was interested in making this observation from the fact that excesses of hair-growth are apt to be correlated with aberrations of nutrition in the gums. So far as I know no studies on the atrophy of the gums have been made. May not systematic researches of these important topics be looked for from those who have opportunities for study in our dental dispensaries?

In conclusion, the evidence supports the belief that a careful study of the gums will assist the observer in framing diagnoses of pharyngeal and nasal diseases; and in addition, that the care of pyorrhea alveolaris should embrace the condition of the entire system of mucous membranes of the mouth, the throat, and the nose.

PHILADELPHIA, No. 117 S. Twentieth St., April 21, 1885.

REDUCTION OF FRACTURE OF LOWER MAXILLA—APPLIANCES.

BY JOHN H. MEYER, D.D.S., NEW YORK, N. Y.

(Read before the Brooklyn Dental Society, February 9, 1885.)

JOE HAFF, a driver by occupation, thirty-three years of age, was admitted to Bellevue Hospital, August 18, 1884. Upon examination he was found to suffer from a compound fracture of the lower maxilla and from several scalp wounds, in one of which the bone was exposed. There existed also a few lacerations and contusions of the face and neck. The point of fracture was between the lateral incisor and cuspid of the right side. The left lateral incisor was missing. There existed also an external abscess. The displacement was five-sixteenths of an inch inwards and one-half of an inch downward. On September 16 a scale of bone half an inch square came away from the end of the outer fragment. At Prof. Bryant's surgical clinic, on September 27, forty days after the accident, I took impressions of the upper and lower jaws in plaster of Paris, for the purpose of making an interdental splint, and models were made as shown in Fig. 1. No effort up to this time had been made to reduce the fracture. The displaced portions were then separated in the model and articulated to the upper teeth, and in that position cemented together before forming the splint. The splint was then made upon the reconstructed plaster cast shown in Fig. 2. In this case a splint was made, as shown in Fig. 2 in position, for the purpose of widening the arch. This was done, at the suggestion of Dr. Kasson C. Gibson, on account of the long standing of the fracture

This splint was made to fit the interior surface of the gums and teeth, and a wire was vulcanized therein, and so placed as to pass around the molars on each side, meeting in front of the central incisors, each end being looped so as to admit of being tied together.

October 1, at Prof. Bryant's clinic, the patient was etherized, and an attempt was made to reduce the fracture; but as a partial union

Fig. 1.

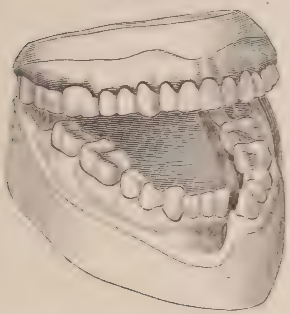
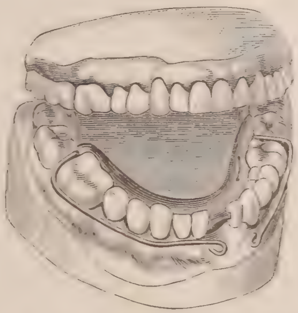


Fig. 2.



had taken place, and the tissues of the jaw had so contracted that the united force of two men was insufficient to break up the adhesion so as to admit of placing the splint, it became necessary to cut the tissues at the point of fracture down to the bone. Then, with the aid of a wheel hook, the fracture was reduced sufficiently to allow the splint to spring into position. While placing the splint the right central incisor, which was very loose, came away. The splint was left in for two days, after which I found that the arch had widened enough to allow it to be removed and reinserted with ease.

Fig. 3.

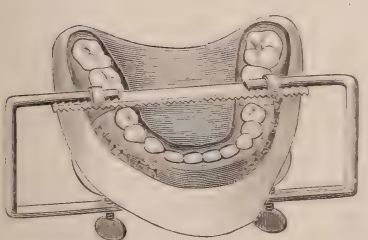
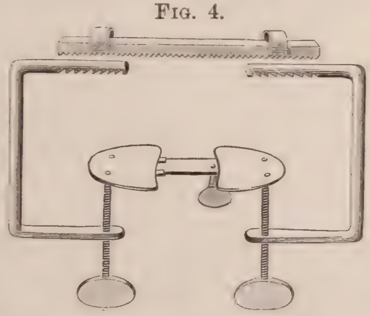


Fig. 4.



On October 3 a new impression was taken, the model being treated as before. A new splint was made,—differing, however, from the first in that it fitted the interior and anterior surfaces of the gums and teeth, allowing the crowns of the teeth to be exposed, as shown in Fig. 3. This splint was inserted October 4, and the fragments placed in proper position. Holes were drilled through the anterior

and interior parts of the splint, between the bicuspids and between the bicuspids and molars on each side of the jaw. The lower teeth were pressed up against the upper, in order to obtain perfect articulation, and while held in that position the holes were drilled through between the necks of the above-mentioned teeth. Then a platinum and iridium wire was passed through them, serving to hold the splint and fragments in proper position. After the splint was thus secured, the patient was at once able to masticate solid food.

October 7, the parts were in proper position, but the abscess, which had been washed daily, was discharging more freely; it was washed with Listerine.

October 15, the condition remained as before; probed unsuccessfully for sequestrum.

October 18, removed a sequestrum from near the seat of fracture, one-fourth inch by one-half inch in size. The abscess was washed as before.

October 26, the discharge has stopped, and the wound is healing.

December 7, the splint is removed and the articulation is perfect.

The great difficulty in reducing the fracture in the above case gave me the idea of a mechanical appliance for this purpose, shown in Fig. 4. It has the advantage of giving a powerful but steady pressure on both sides of the maxilla, and does away with the need of an assistant. I have tested it practically, and have found it to answer in every respect. It is very simple in construction, consisting of two three-sided arms, the upper extremity of each arm being serrated to secure a better hold on the splint. The lower extremities have an opening with a screw-thread. Through each of these passes a screw connected with a plate calculated to rest upon the lower border of the maxilla. The plates are connected laterally with a piece of steel slotted so as to allow of their adjustment for different cases, and held in position by a thumb-screw. This arrangement affords a powerful leverage over the displaced fragments of the jaw. The serrated ends can be adapted either to a cap splint or a perforated one, which exposes the grinding surfaces of the teeth. In the latter case a small portion of the rubber is left covering one of the molars or bicuspids upon which to apply the force, which can be removed as soon as the fracture is reduced. The instrument is adapted to simple and multiple fractures, and is of great convenience.

In some cases it is desirable, in order to secure more uniform pressure, to use a serrated bar in connection with the reducing appliance, which is shown in Figs. 3 and 4.

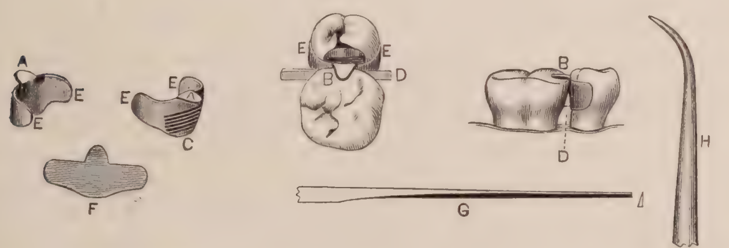
CLASP AND BAND MATRICES.

BY J. A. WOODWARD, D.D.S., PHILADELPHIA, PA.

The efficiency of the clasp matrix is mainly due to an extension, Fig. 1, A, forming a lug, B, which rests upon the approximate tooth, preventing movement of the matrix in the direction of the cervix, and parallel grooves, C, across the reverse. The edges of these grooves are sharp, and pitch away from the cervical edge of the matrix. The wooden wedge, D, will be caught in them, when pushed between the matrix and the adjoining tooth, retaining the matrix and holding the wedge free of the gum. The steel blank, F, is No. 28 thickness, standard wire gauge, and will make a matrix for bicuspids below medium size. For the medium size and above the blanks should be No. 27; for the molars No. 25.

Boxwood is preferred for wedges. They are quickly and easily formed with a new file, and should taper in two directions, G. The width and thickness is determined by the shape of the teeth and the

Fig. 1.



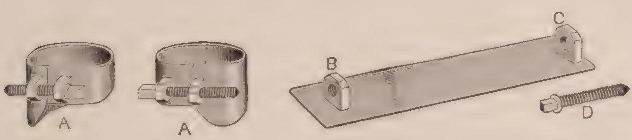
space between them. It is most convenient to press the teeth apart until there is sufficient space to allow for the contour of the filling and the thickness of the matrix. Should the cavity be extensive, the preparation can be completed at once, a thin, tempered matrix adjusted, and the filling inserted. The teeth can be separated by a screw-separator and the filling finished, or by cotton tape and finished subsequently. The preparation of approximal cavities should be the same as is usual for contour fillings, excepting when the gold is to be inserted in the cylinder or mat form so much cutting away for access is not required. If a suitable matrix is not among those previously used, a blank should be fitted to the tooth to be filled much the same as a clasp for plate work. The matrix near the ends, E, should press the sound surfaces of the tooth with a moderate amount of pressure, sufficient to spring the face of the matrix clear of the cervical margin of the cavity. The lug, B, should next be bent to rest upon the approximate tooth, the cervical edge dressed (filed or burred) until it passes a little below the cervical margin. The grooves on the reverse of the matrix are now cut with a fine,

thin-edged jeweler's file so that they will lean or pitch away from the cervical edge. The matrix should next be hardened and the temper drawn until it will spring and not bend nor break. The face should now be polished to reflect light. When adjusted it should be clear of the cervical margin of the cavity, and have sufficient spring to pinch the wedge, so that, with the aid of the grooves, it will be retained as intended, and also allow the filling material to overlap the cervical margin. Should the tooth be of such shape that a part of the cervical margin only is free, the filling may be commenced at that point, a suitable cylinder or mat of gold being securely wedged there between the matrix and floor of the cavity. This done, the matrix will have moved a little away from the tooth—provided the boxwood wedge has not been too tightly inserted. As the filling progresses all margins may be slightly and securely overlapped with the gold. The filling, if large, may be commenced at a starting point and completed after any of the methods for inserting cohesive gold fillings—the matrix merely moulding the filling. It is preferred to commence the filling with mats or cylinders of soft gold (Globe, semi-cohesive, No. 4), securing one or more of them at some point or points along or across the cervical wall, depending entirely upon the hold in the tooth to prevent movement of the gold during its insertion. The surface to be in contact and those exposed to attrition are finished in cohesive gold impacted with the aid of a mallet. The removal of the matrix demands care. The wooden wedge should be withdrawn; the matrix next drawn directly away from the neck of the tooth until the grooves offer resistance. The teeth are now gently forced apart by pressing the soft steel probe, H, between them below the matrix, when it will readily come away. When the filling is amalgam the matrix can be removed in this way without fracturing the filling. The filling and approximate tooth are generally in contact after the removal of the matrix, and care must be exercised to avoid an excess of of filling material approximately, particularly when pulpless teeth are present. A saw or separating file will clear the way for the finishing appliances. Little labor is required, the margins of the filling being readily trimmed flush and polished.

A, A, Fig. 2, represent the band matrix. It is almost indispensable where large fillings restoring the whole or parts of the crowns of molars and bicuspids are to be quickly and comfortably inserted. An impression of the tooth for which the matrix is to be made is taken in modeling compound. A piece of straight-grained pine wood, about four inches in length and a half inch square, is next whittled and filed to fit the impression, and should taper slightly so that the matrix will have a little less diameter at the cervical

edge. A strip of phosphor bronze, No. 30, standard wire gauge, as wide as the matrix is intended to be, should be bent around the pine stick and overlap about one-sixteenth of an inch. The threaded post should be set with binding wire or a clamp made of piano-wire, about one-eighth of an inch from one end, B, of the strip of bronze, and soldered with silver solder. The post in which the screw turns free is set near the other end, C. The distance the post, B, is from the end of the strip is the amount of variation in the size of the matrix. German silver No. 16, standard wire gauge, answers nicely for the threaded post; the other post may be lighter, No. 19. The screws are of steel, and have a square head which will fit a large-sized watch-key, which after filing off the ring may be fastened in any kind of a handle. The screws should generally be about seven-sixteenths of an inch in length over all, D. When the posts have been soldered, the matrix should be bent around the pine stick and secured with the screw. The cervical margin can now be trimmed

FIG. 2.



to follow the line of the gum, with a corundum point or finishing bur, and the matrix polished. The threaded post must be set distally, so that the screw-head may be directed mesially, and it is most conveniently turned with the key when it is on the buccal surfaces of the teeth. The cervical and all margins of cavities which will come close to the matrix are best prepared before the matrix is adjusted. This done, the matrix is secured on the tooth by closing the band with the screw, after which the rubber-dam is passed over it and such adjoining teeth as may be thought best. The dam will readily pass between the matrix and approximate teeth, and, with little discomfort to the patient, can be easily carried below the cervical edge of the matrix. The preparation of the cavity can now be completed. The bronze being soft and tough, can be burnished to mold the filling, as the conditions present demand, care being taken that a little space is left to allow the filling material to overlap all margins. The removal of the matrix requires no particular care. The screw is disengaged from the threaded post, the ends are spread apart, the matrix is pushed slightly towards the tongue, and is then easily withdrawn.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a regular monthly meeting, Tuesday evening, March 17, 1885, at the residence of Dr. C. E. Francis, No. 33 West Forty-seventh street.

The president, Dr. William Jarvie, in the chair.

Dr. J. Morgan Howe. Before the regular order is entered upon I would like to say a word or two. It is known to most of us, probably, that at the last regular meeting we expected to have had the pleasure of the presence of a number of our distinguished friends from Chicago, and of listening to a paper by Dr. Harlan. It is also known that they were detained on the way by a snow-blockade, much to our disappointment. Although the society had the pleasure of entertaining them at dinner the following evening, that is only half the loaf we had expected. I move, Mr. President, that the secretary be requested to communicate with Drs. Harlan, Brophy, Gardner, Ames, and Reid, expressing the regret of the society that they were unable to be with us at our last regular meeting; and I move that the paper of Dr. Harlan be published in connection with the transactions of that evening.

Dr. Howe's motion was carried.

Incidents of Office Practice.

Dr. S. G. Perry. I have brought with me this evening a cast, showing you at a glance what can be done by over-brushing the teeth. For twenty years the patient has brushed vigorously, using the Oriental Tooth-paste. The grooves were so deep that the pulp of the lower left cuspid was exposed, and that exposure brought him to my office. The pulps of the upper centrals and laterals were almost exposed, being just covered with a thin layer of dentine,—so thin and transparent that the rosy color of the pulps underneath was very perceptible.

While I am on my feet I will mention a number of cases that I have had in the last few years of broken teeth, the broken pieces of which I have simply dovetailed and placed back in their positions, using oxyphosphate of zinc. In one lady's mouth I have four such broken outer cusps of bicuspids, two of which have now remained in position for a number of years. Even thin pieces of broken teeth can be dovetailed with the minim burs so as to hold quite well when the cavities which generally underlie them are filled with the oxyphosphate. It is a great comfort to the patient to have a broken tooth replaced and secured in a few minutes.

Also, in several instances where natural teeth were broken off completely, I have placed them back on their roots, drilling into the root and setting a post, and then drilling the broken crown and setting it over the post with the oxyphosphate as if it were an old-fashioned pivot tooth. This can be done even when the teeth are broken—as they generally are—somewhat transversely.

Dr. F. Y. Clark. How do you know it was over-brushing the teeth that caused the abrasion mentioned in connection with the cast?

Dr. Perry. I have every reason to believe so, because the man told me he was a vigorous brusher; and he is a right-handed man, as you will see by the cast; the teeth on the left side show more abrasion than those on the right side of the mouth. Would you not think it was done by brushing?

Dr. Clark. Yes, it looks very much like it. I have just received a brush from Dr. B. F. Arrington, of Wilmington, N. C., which is designed to overcome that trouble, and it is believed by many that it will do so if it is caused by brushing. It is intended to brush the teeth longitudinally, and is the most practical brush for the purpose that I have seen.

President Jarvie. These cases that are related here in this way are frequently of more value on account of the line of thought they carry us into than the actual cases themselves are. Dr. Perry suggests that this case is one of mechanical abrasion; and it is evident that other gentlemen in the room believe it is brought about by something quite different. If there is any such thought, this is surely a good time to express it, in order that we may gain something by the case that has been presented.

Dr. Clark. The reason I asked the question is that I had in mind at the time a case that I saw thirty years ago, in the mouth of a person who never used a tooth-brush,—a case of the same kind of abrasion. I cannot account for it; certainly brushing will not account for it in the case I speak of.

Dr. C. E. Francis. I doubt very much that this abrasion is caused wholly by the use of the tooth-brush. I have seen many cases in my practice where teeth were very badly abraded, in which I am satisfied that the brush was not the cause. Only this morning a gentleman came into my office with his teeth cut almost into the pulp-chambers, so that you could see the pulp through the translucent secondary dentine. The teeth were cut away not only on the labial and buccal surfaces, but also on the palatine surfaces, where the brush could not reach them. They were as smooth as glass. It was astonishing to me, and I could not account for this peculiar appearance. I do not think it is due to over-brushing; the gentleman

tells me that he brushes his teeth very little; indeed his teeth were badly stained, and quite yellow from extraneous matter. It is unaccountable to me how this peculiar abrasion occurred.

Dr. John B. Rich. I have in my practice a patient whose teeth have been under my care for fifteen or twenty years,—a gentleman who does not use tooth-powder, and who always uses a soft brush, by my direction, and his teeth are denuded in spots all over; different parts of the teeth are worn away, in many cases, as though they had been filed. All of the teeth in his mouth are affected in that way. The abrasion does not follow the track the brush would take, but sometimes takes a different angle. It is a singular case. The process of denudation goes on all the time, and the destruction is becoming so great that I do not know what to do to remedy it. When it is confined to a certain line it can be remedied by cutting away and filling, but this is a case in which I should have to cover the whole crowns of the teeth with gold. Many of the teeth are denuded for fully three-fourths of their length above the gum. This denudation cannot be caused by over-brushing.

Dr. Perry. I think we have all seen cases of abrasion in which brushing is not one of the factors; but I exhibited this case believing that it was one where the wasting away of the tooth-substance might be due to over-brushing, because the gentleman said he had been a vigorous brusher for twenty years; and you see that he is a right-handed man; where he has used the right hand most vigorously is where the teeth are grooved the most. Where the brush does not touch the teeth are not grooved at all. I would not claim that the brush, unaided by the solvent action of an acid, could work this mischief; but I certainly do think, if the brush in this case had been used less vigorously, or had been used intelligently, that these deep grooves would not have been formed.

Dr. Clark. I remember that a number of years ago I worked several hours with a lathe-brush and percipitated chalk, and all the ordinary tooth-powders, upon teeth which I had extracted, and it had no effect upon them other than to leave a smooth, polished surface. If any of you, gentlemen, will try that experiment, I think you will find that several hours' work with a brush and the ordinary tooth-powders will have no effect except to produce a smooth, polished surface. I cannot believe that brushing alone will produce the abrasion of teeth spoken of here, and that we frequently see. I believe one great factor in that destructive process is some agent that is floating around the margin of the gum.

Dr. Perry. Why is it that there is no abrasion, comparatively, on the right side?

Dr. Clark. That seems to be a good argument in favor of your

theory. I have four or five teeth in my own mouth that are worn away in that way just above the margin of the gum. This abrasion usually occurs near that point; the grooves take a certain direction, following the line of the gum; and I think it is reasonable to suppose that there is some agent floating around the margin of the gum—call it bacteria or what you will—that causes it. I am not willing to say that injudicious brushing does not accomplish more or less of this destruction, but I am fully satisfied that the brush is not the only factor.

Dr. Kingsley. Dr. Clark says, with reference to abrasion, that he has worked away upon teeth with wheel brushes and powders, and could produce nothing but a polished surface. The effect that would be produced by that operation I think would depend entirely upon the condition of the teeth experimented with. There are teeth in some mouths in such condition that if you should treat them in that way they would be cut away pretty rapidly. There is something besides the brush to be considered in some of these cases. We have all of us seen teeth that at times seemed bordering upon disorganization, really almost to dissolve away, and at later periods the same teeth seemed to have recovered their tone. It is rare that all the teeth in the same mouth show this condition at the same time. It is more commonly one or two, or at most a limited number. I have my doubts if this wasting of surface, even to the extent of groove-forming, is wholly due to local external agents. Nevertheless, teeth in that condition would yield more readily to active brushing than at some other periods. These teeth I believe have been affected by the brush, but I do not think it is the brush alone that causes the wasting away. The transverse lines of the grooves indicate the brush.

I wish to improve this opportunity to do a little bit of tardy justice. You will remember that something like a year ago the matter of crowns being struck up from a single piece of metal was under discussion. I think Dr. Jarvie brought before us an example of crowns which had been struck up in his office from a single piece, and I made some remarks at that time. It seems that after that discussion was published it attracted the attention of Dr. Creager, of Fremont, Ohio, and he sent me a couple of crowns, mounted on a plaster cast, which he said were struck from a single piece, and were copies of what he had done two or three years before; and he wanted me to present them to the Odontological Society, as showing that he had done this kind of work before Dr. Jarvie did it. They did not reach me, I believe, until after the Odontological Society had adjourned for the summer. I will pass them around now, so that proper credit may be given to the gentleman.

About a year ago my favorite twist drill (I think we all of us find, sooner or later, some one instrument that becomes a favorite) got its point broken off, but it was a better drill after the point was broken off than it was before. I have learned by that, whenever a twisted drill fails to cut, to just break off a little bit of the end, and it will be better than when it was new.

Dr. Abbott. I want to return, for a moment, to the subject of what is called horizontal grooving, or cutting away of the teeth by brushing. Lately it has seemed to me that we see more of this than formerly. I have always contended that it was due, in the first place, to the action of some solvent of the lime-salts, and then the brush cuts away the material that had been softened by the action of this solvent, which is probably some acid. I have discovered still further, I think, that in all these cases the beginning of the difficulty is natural horizontal grooves in the enamel of the teeth themselves. I have two or three cases in my mind, one in my own mouth in particular, which is perfectly conclusive that this natural condition must be the cause, or tends to produce it. A great many incisors are grooved about half the distance from the gum to the cutting edges,—*i. e.*, they have a wavy appearance. As the brush passes across them the bristles are brought into the little hollows or depressions between the waves more emphatically than upon the elevations or waves themselves, consequently cutting away more rapidly. The enamel being thinner in these depressions, it is soon cut through. The dentine being softer and more readily affected by both the acids and the brush, a case of quite extensive horizontal grooving is soon the result. I had a patient in my chair to-day on whose upper front teeth there is certainly not more than one-quarter of the enamel left; it has been almost entirely removed by brushing and the action of acids. The teeth originally had this peculiar wavy enamel that I have spoken of.

Dr. La Roche. In the case you have just described, did you notice more abrasion on one side of the mouth than there was on the other?

Dr. Abbott. If anything, I think the abrasion on the left side of the mouth was worse than it was on the right. The brush is almost always used the hardest on the left side.

Dr. La Roche. Could you give any other reason?

Dr. Abbott. No.

Dr. La Roche. When a person masticates mostly on one side of the mouth, I think you will find the same state of affairs. There is a deposit on the teeth that is natural to almost every mouth, and I have observed that on the side that is used most and brushed most this abrasion occurs. There is a deposit on the side that is not used, which I think protects the teeth from this abrasion. I have one

case in my mind where the teeth on the left side of the mouth were affected in that way; they looked as though they had been filed with a three-cornered file, so deep that I could see the site of the pulp cavity. I made up my mind in that case, as well as in other cases, that one side was protected by some kind of saliva or other secretion.

Dr. Rich. I had occasion some time ago, at one of the meetings of the Odontological Society, to mention the destructive effects upon the teeth of the use of lemons. I have to-day examined the teeth of a patient who has been abroad recently, and who has a strong appetite for lemons, taking them raw, and the destruction of the teeth that has taken place in about six months is astonishing. Almost all the teeth, commencing with the second bicuspid of the lower jaw, and around the first molars, are in such condition that the pulps are almost exposed in every one of them. I have never seen such wholesale destruction produced in that time by any substance. I asked the lady what acid she used freely. At first she said she had not used any acid. I questioned her further, and found that she had been using lemons freely. She was very fond of them, and was in the habit of cutting them up and eating them several times a day. The destruction of her teeth is really something astonishing; the cavities in many cases extend over one-third of the whole surface of the teeth, and every one of them all around the arch is decayed on the approximal surface. I saw her teeth just before she went abroad, and there was then nothing to be done to them. She is about fifty years of age, and has lost none of her teeth.

Dr. Perry. I have here an apparatus which I show with some hesitation, as it may be that every gentleman in the room has seen the same thing before. I do not know who is to have the credit of first making such an appliance as this, but certainly in some dentist's hands or in some dentist's office at some time I have seen something very much like it. It is a very simple device for drawing in or back teeth which stand out of line. It is simply a rubber plate made to cap the molars and bicuspids, with a gold band outside of the front teeth, one end of which is vulcanized into the plate opposite the first molar, and the other end, having a thread cut on it, is passed through a stud which projects opposite the molar on the other side of the mouth. Turning an adjusting nut, which rests in a slot cut into the projecting rubber, shortens the band and draws in any teeth which are out of line. A wrench is made to fit the nut, so that the work can be done by the patient. This regulating apparatus is no thunder of mine; there is nothing about it that is original with me, unless it is the way in which the nut is protected from the cheek. The one I saw had a gold stud standing out of it through which the gold bar went before receiving the nut. I

thought this would chafe the cheek, so I put it through and protected it by the rubber, as you see. I have had such success with this that I am led to show it—even at the risk of its being well known to you all.

Dr. Kingsley. I am disposed to think Dr. Perry saw that apparatus, or a similar one, in my office, because I was using it two years ago or a little more. It is not exactly the same, from the description he now gives, but the principle is exactly the same. This arrangement I think is a little better.

Dr. Northrop. May I ask Dr. Kingsley wherein the regulating piece that has been spoken of by Dr. Perry is superior to the one he himself used two years ago or more?

Dr. Kingsley. I think that adding the spurs of vulcanite, running the rod through, and putting the nut between them, makes a better protection to the cheek than the way I had it arranged. Mine, that I referred to as being used about two years ago, instead of being exactly like this, had a bar that went around in front of the teeth and terminated in a right angle, and through that angle a screw went into a nut, which nut was fastened in the vulcanite plate. I think with my plan I could get at the screw perhaps a little more conveniently than with this,—perhaps not. In my appliance the screw was turned by an ordinary watch-key with a long handle, while in this arrangement the nut would have to be turned with a wrench having a right angle.

Dr. Northrop. Did not Dr. Kingsley use the same thing some ten years or more ago, with the exception of using the screw; did he not have a little hook at one end of it, corresponding to the screw, and an elastic band?

Dr. Kingsley. Exactly the same arrangement, only using elastics to tighten the band, I have used from time to time for twenty years. With the screw and nut there is no risk of its failing to do the work, as is sometimes the case with elastics. The screw in some cases is thus superior to the elastic.

Dr. Rich. Dr. Kingsley has used both the screws and elastics as forces in connection with his regulating apparatus, and from his large experience and good judgment in this matter we may learn something. May I ask him which he considers the best, the positive force that is exerted by the screw, as in this case, or that which is obtained by means of an elastic, as in the apparatus he was in the habit of using years ago?

Dr. Kingsley. There is no positive best; it is always relative. In cases where teeth yield easily and readily I do not care to use a screw. I can put on an elastic, and the work of moving teeth goes on gradually and continuously. But there are cases where I have

not been able to get an elastic strong enough to do the work. I have had patients about eighteen or twenty years of age where the teeth were so firmly set that an elastic would not move them. In such cases the screw is the best, but for general use I would not use the screw, but the elastic. So there is no positive best.

Dr. Rich. What I want to get at is whether it is not thought best to have this movement made by an apparatus which applies as nearly a positive force as possible; whether it is not considered best to move the teeth, and keep them in their place, so that there will be no backward movement, by a method that will regulate the amount of force positively; whether that is not a better and more philosophical way of accomplishing the object than the somewhat less exact and uncertain means of the elastic. I am free to say that of these two methods I am much in favor of the positive force, applied to the work and retained positively all the time, either in the case of young persons or old persons. I was very anxious to hear an expression of opinion from Dr. Kingsley on that subject. My own impression is that a force exerted positively, and which keeps the teeth in the position they are moved to, is the best method of accomplishing the object.

Dr. Kingsley. My remarks upon the relative value of screws and elastics were made with reference to their use in conjunction with an apparatus to reduce the size of the arch, such as is shown here. In regard to the use of the screw in the movement of teeth, I hold exactly the same opinion which Dr. Rich has expressed, but under different circumstances. For example, we all know that the so-called Coffin plate is a plate covering the roof of the mouth and split through the center, but having before being split a sort of doubled-up piece of piano-wire bent back and forth and attached so that one end of the wire is in one-half and the other end in the other half, and it is expected that the pressure of this wire will widen the arch. Now, I have heard of great results being accomplished by such an apparatus. Dr. Coffin himself, as near as I can remember, showed on one occasion half a bushel, more or less, of such appliances that had been worn by as many different individuals, and all ended in complete success. I have seen one or two cases brought before this society, I think, where the gentlemen presenting them claimed that they had accomplished great success with the same kind of an apparatus, which, as Dr. Rich has said, is an unequal, certainly not absolutely positive, pressure. I have tried that kind of an appliance over and over again only to end in disgust. I can rarely move a jaw in that way. But I can put in a plate and a jack-screw, and by turning the screw a little every day move the jaw with certainty.

President Jarvie. Gentlemen, here are some instruments to be passed around, and Dr. Bogue has something to say about them, I believe.

Dr. Bogue. These instruments are forms devised by Dr. Allport. They are something like a bayonet in their bend, and sharply file-cut down to the upper end where the mallet strikes. Dr. Allport informed me that he also considered it important to have the heads quite hard if the mallet used were to be a steel mallet. The burnishers are peculiar only because of their form. I believe the form of both burnishers and pluggers is the work of Dr. Allport.

President Jarvie. Dr. Goodwillie has, I believe, something to present. We will be pleased to hear from him now.

Disease of the Nose from Injury to a Tooth.

Dr. D. H. Goodwillie. Mr. President and Gentlemen: I take pleasure in responding to the invitation of your executive committee, and will present a case of disease of the nose from an injury to a tooth.

The patient, a gentlemen aged thirty-one years, was referred to me by Dr. Ross, of Montreal. He has been a great sufferer from naso-pharyngeal catarrh, which has now extended to his larynx. His history and the condition of his case are as follows: In boyhood he received a blow from a base-ball upon the central incisors, fracturing the cutting edge of the right central and the anterior approximal corner of the left central incisor. Great pain and swelling followed in both mouth and nose, which subsided after a time, but left great stenosis of the right nostril. Naso-pharyngeal catarrh followed in consequence, and gradually grew worse until he now applies for relief. When I first saw him he presented the following conditions, viz.: Some external swelling on the right side of the nose, complete stenosis of the right nostril, produced by a sharp deviation of the cartilaginous septum, which was also much hypertrophied. By a rhinoscopic examination there was seen much hypertrophy of the tissue covering the turbinated bones; tonsils large, uvula long. The blow upon the tooth produced suppurative pulpitis, the discharge finding its way through the floor of the nostril into the inferior meatus, setting up perichondritis of the nasal septum. The nostril now being closed, rhinitis and follicular pharyngitis in its chronic form followed as a result of non-respirative and pent-up nasal secretions. Now laryngitis is present in the acute stage. I pass around for your inspection a wax model of the case before the operation.

The treatment consisted in the extraction of the necrosed right incisor. The pulp-chamber had never been filled. There was a small gold filling in the fractured surface of the tooth. A probe

passed up the tooth-socket into the nostril. The deviated and hypertrophied cartilaginous nasal septum was removed by means of my nasal-septum punch. Through the opening now made some necrosis of the anterior part of the vomer was discovered. By the periostomes the soft parts were denuded and the bone removed by the nasal forceps. Notwithstanding the amount of tissue removed from the septum, the nostril was not sufficiently open, on account of the hypertrophic tissue covering the posterior part of the turbinated bones. This was removed by means of scarification with a galvano-cautery knife. I pass around for your inspection a wax model of the case six months after the operation. You will observe that the nostril is quite free from all obstructions, with good respiration. I exhibit, also, the parts of the septum removed and the instruments used in the various operations.

While this case illustrates nasal disease from *injury* to the teeth, naso-pharyngeal catarrh also occurs as the result of *decayed* suppurating teeth. But I cannot further trespass on your time to relate other cases.

Threatened Mania from Retarded Wisdom Teeth.

Dr. W. T. La Roche. At a meeting of the Odontological Society, April 24, 1883 (reported in the Dental Cosmos for October, 1883, page 540), Dr. Wm. Jarvie, of Brooklyn, mentioned a case brought to his notice by a physician. The patient was a gentleman about thirty years of age, in robust health, and of good habits. In January or February of the preceding year he seemed to have become somewhat morose, rather ill-tempered and quick to take offense, and from that the symptoms gradually ran into those of acute *mania*, so that he was not to be depended upon at all, and required a nurse with him all the time. The gentleman was advised by his physician to visit Bermuda for change of air and scenery. He did so, and returned in pretty much the same condition as when he went away. The family and his physician were unable to get any clue whatever as to the cause of this malady. An article had been published in the *Sunday Times* in regard to mania arising from disturbance of the tooth-pulp, and since reading that article the gentleman's family had recalled to mind the fact that at the very time when this disturbance commenced he went to a dentist to have a tooth filled. The dentist removed an old filling, and told his patient at that time that there was a little pus and blood exuding from the pulp-cavity. The operation was quite painful, and there was a great deal of pain in the tooth for a week afterward; also disturbance of the *aural nerves*; his hearing was affected, and he was troubled with neuralgia on the same side of the face.

A similar case is on record where a Boston gentleman, thirty-three years of age, from disturbance of the pulp, became quite insane, and on removal of the tooth in that case complete recovery followed. I mentioned the case of a patient at that time in my care, who had been in my hands for nearly two years, and whom I was treating for retarded eruption of the wisdom teeth. A number of physicians diagnosed his disease as brain trouble *per se*, and treated him accordingly. In my remarks I said that the above cases showed that the *nerves* may be very seriously affected by the eruption or diseased conditions of the teeth. I was asked by a member if the gentleman was insane. I answered that he was very near it, and that the gentleman himself thought he would become insane, and that his physician, Dr. Dieffenbach, had said to me, "This man will be a subject for the lunatic asylum if he is not relieved of those wisdom teeth." I promised to give the Odontological Society a full history of the case at some future time. His long-protracted illness commenced with pain in the head in July, 1878.

My attention was first professionally directed to the case of Mr. W—— by being requested to extract a carious left superior sixth-year molar in December, 1881, but on account of the very delicate condition of the patient I did not extract it till about the 1st of February, 1882, some five weeks later. The pulp had been devitalized and the tooth prepared for filling while he was in the country, but on account of the dentist attending to it having been unexpectedly called away the operation was not completed. I had filled several teeth for Mr. W—— when he was twelve years old, and I found them in good condition. I said to him, "You have lost all your wisdom teeth except one?" His reply was, "Oh, no; I have never had a wisdom tooth extracted." I made a more thorough examination a few days later, and, taking his age into consideration (he was in his twenty-seventh year), I became convinced that the real source of his long and severe illness and brain trouble was caused by the retarded eruption of the wisdom teeth. Knowing that he was at this time in the hands of a specialist, who was treating him for brain disorder, I told him at once that I did not believe that his trouble was with his brain. This surprised him greatly. I told him I was sure his brain trouble was caused by reflex nervous action from the source above stated. At this time but one of his wisdom teeth had normally erupted; this was in the right superior maxilla. Judging from the griping pains in his jaws, extending therefrom to the back of his head, and locating the non-erupted wisdom teeth, confirmed me in the opinion that my diagnosis was correct. I refused to take his case as long as he was in the hands of a specialist, being treated for brain trouble. This point being satis-

factorily settled, I then undertook his case. He told me that Dr. Wm. A. Hammond concurred in my diagnosis. In each case I found it impossible to remove the wisdom tooth without first removing the twelfth-year molar. My first operation was to extract the upper left twelfth-year molar, hoping thereby to afford relief by so doing. This was accomplished in April, 1882. At the same time I endeavored to extract the wisdom tooth also, but on account of its position, and the patient being so weak and delicate, I did not succeed. It was not deemed advisable to administer an anesthetic, and without one the shock was to be dreaded. It was not until the following December, seven months later, that I was able to extract this left superior wisdom tooth, during all of which interval he was in very great pain and suffering constantly from excessive nervous prostration. This tooth had three diverging roots, all of them largely exostosed. The effect of the operation was almost immediate, the benefit being very marked, and he was soon able, for the first time in three years, to resume business and take part in social enjoyments. His health continued good until his return in September from the Catskills, where he had spent the summer, when he reported to me that he was again suffering in a manner similar to that which he had suffered previous to the extraction of the above-mentioned tooth. I found on examination that the right inferior wisdom tooth was giving him trouble. Previous to his going away I had told him that, at the first indication of any trouble in the lower jaw, I would advise the extraction of the twelfth-year molars at once. I now reiterated this advice and urged its immediate adoption. Hoping to relieve the pressure and mitigate the pain, the right inferior twelfth-year molar was extracted in October, 1882; but to my disappointment the operation did not afford perceptible relief. I now hoped that the wisdom tooth would erupt in the normal way, but it did not. After a few weeks the absorption of the surrounding gum-tissue revealed the exact position of the retarded tooth. I found it lying diagonally across the ramus, a position from which it was very difficult to remove it. I had much difficulty in finding an instrument that would grasp the tooth. I finally removed it on December 24, 1882, an interval of six weeks. This tooth was also bifurcated and exostosed. The effect of this operation was not what I had hoped for, the pains continuing, but changing to the left side. Owing to the very nervous and prostrated condition of the patient I was obliged to defer for a few days the extraction of the left inferior twelfth-year molar. This was done in February, 1883. At this time I did not cut to find the wisdom tooth. I could see no external evidences of it. As before, I waited, hoping relief would follow, but, as the pains continued without mitigation, shortly there-

after I made an examination and struck the wisdom tooth deeply imbedded in the ramus. It really appeared as though the tooth tried to go out through the facial side of the ramus. The patient continued to suffer intensely. I really thought he *would* lose his mind. One of his physicians had previously said to me that if the cause was not removed he would certainly become insane. He suffered so much that, at his urgent request, I consented to attempt the extraction of the tooth in May,—some twelve weeks later,—though feeling almost certain that the attempt would be fruitless without an anesthetic; and this proved to be true. His very delicate condition rendered it impracticable to administer an anæsthetic, or to do anything to cause a sudden shock. This factor in the case greatly hampered me all through. His eyes, too, became affected sympathetically. Sometimes he could not see at all during the spasms of pain. He would be almost delirious at times with the severe pain in the back of the head. As he described it, his head would be sore to the touch. With reference to anesthetics, Dr. Hamilton, who at one time had been his physician, had refused to sanction their use in his case. While I duly respected the high authority of this opinion, and had been governed by it, nevertheless I did not concur in it. Finally, on or about the 9th of June, I succeeded in extracting this tooth, the patient having been first placed completely under the influence of ether. I was assisted in this operation by his attending physician, Dr. J. F. Davis. The tooth was a very remarkable one, both as to location and formation. As to location, it was inclined, by reason of its extreme exostosed condition, to make its appearance through the maxilla on the facial side; in fact, after the extraction, the face there was extremely sore, a slight protuberance showing. As to formation, it was bifurcated, and its exostosed condition had united the bifurcation, so that the nerve-currents were, by the progress of the exostosis, partially cut off. I dressed the aperture carefully every day with a weak solution of carbolic acid, alternating with permanganate of potash and wine of opium; but on account of the terrible strain upon the parts attendant upon the great force necessary in drawing out the inverted wedge-shaped exostosed roots, there was much inflammation to contend against. By the latter part of June he had so far recovered that he was able to leave the city for the Isle of Shoals, where he remained in a comfortable condition until about the 6th of the following September. Shortly after his returm home he complained to me of pain in the same side of the face. From about the second week in September he had a severe relapse, and at times, as before, was almost crazy with pain. About the 1st of November following I was obliged to use the engine bur for the purpose of re-opening

the aperture made by the extraction of the wisdom tooth. This I did thoroughly, breaking down the septum between the wisdom tooth and the twelfth-year molar. Prior to this, on account of the severe prostration of the patient, I had only partially opened the cavity. After the operation he revived again, gained strength, and we both thought he was now going to be well; but, to my surprise, he was again attacked with pain in the superior right side, in the only normally-erupted wisdom tooth that he had had. As I have before stated, I had extracted the right inferior wisdom-tooth and twelfth-year molar, consequently these superior teeth had no antagonists. Elongation in both teeth was now apparent. A very slight fissure exposure was found in the wisdom tooth and the dentine exceedingly sensitive. Both teeth became very sore, and the least pressure of the finger was painful. I therefore advised the extraction of both; nevertheless, I could not persuade him to have it done without an anesthetic. During the next five months his health was very poor and his general condition low. He was in the care of Dr. E. B. Pardee, who was at first averse to giving him any anesthetic, but finally, as he had made some improvement under his treatment, on the 30th of May he assisted me in administering the nitrous oxide gas, and I extracted these teeth. Thus, after a series of operations and treatment by me extending over a period of three years, and treatment by many physicians—some ten, I am informed—for a period of more than six years, the causes having been fully removed, the brain trouble ceased, and has not returned.

President Jarvie. In regard to the case which I reported about two years ago, and which is referred to by Dr. La Roche, I would say that there has been no improvement in the condition of the patient since that time.

E. T. Payne, D.D.S., *Secretary.*

SOUTHERN DENTAL ASSOCIATION.—SEVENTEENTH ANNUAL SESSION.

(Continued from page 289.)

Second Day.—*Morning Session.*

The association was called to order by Vice-President Catching.

On motion of Dr. McKellops, a half-hour of each day, at the close of the morning session, was set apart for the exhibition and explanation of appliances.

Several committees were called and passed. When the Committee on Operative Dentistry was reached, Dr. W. N. Morrison, St. Louis, read a paper protesting against the unnecessary sacrifice of dentine in devitalized teeth, and detailing his method of dealing with such cases. Following is a synopsis:

Dr. Morrison wished to call attention to the reckless sacrifice of tooth-substance in devitalized teeth. We have been instructed when opening dead teeth to cut freely and to make the openings large, so that we can see into every part of the cavity, and in many instances to drill out the individual root-canals, removing solid dentine from the best part of the crown of the tooth, unnecessarily weakening it in the place where it should have the most strength. In many instances the roots are filled with cotton, and the cavity with whatever material is used, leaving only a thin, frail shell of dentine between the filling and the enamel. Soon follows the breaking down of these walls by the ordinary use of the jaw in mastication. He has always felt that there was no excuse for this wholesale destruction of so important a part of the teeth, and has been working to save all the crown substance of dead teeth possible. With the method of root-filling which he has used for many years, with pure gold wire, of size to correspond to the sizes of the different canals, it is possible for almost any operator to fill the canals of the molars through an opening not to exceed one-sixteenth of an inch in diameter, made directly in the center of the crown with a drill, the sharp angle at the lower end of this hole being slightly funnelled with a round or truncated cone bur. Access is had with small steel broaches for the removal of the dead pulp, and the cleansing and treatment, if necessary, of the canals. He protested against the over-treatment of canals where the pulp-tissue is entirely removed. When certain of this, and that there is no inflammation in the peridental membrane, he fills the canals immediately.

He recently had a case of a lower first molar, with a very large mesial cavity of black decay, the patient being a gentleman about forty-five years of age. Being uncertain as to whether the pulp was healthy enough to live, he put in a large filling. The tooth remained comfortable for several weeks, but finally it began to have neuralgic disturbances, with flashes of pain and extreme sensitiveness to thermal changes, both of the air and food, the pain recurring nearly always at night. The gentleman was anxious to keep the pulp alive, but one morning he said he could endure it no longer. An opening not exceeding one-sixteenth of an inch in diameter was made into the pulp through the top of the crown, without removing the mesial filling, and the vessels were removed from one of the roots without much pain. Those of the other being exceedingly sensitive, were devitalized with arsenious acid. In removing the pulp, a nodule of secondary dentine, about the size of a quail shot, was discovered in the pulp-chamber. With a small, sharp barbed broach the pulp-tissue was torn from this nodule, which was perfectly smooth. The nodule was then rolled forward over the orifice into the mesial

roots, and the distal root was filled solid to its end with gold wire, using chlor-percha to fill the interstices between the wire and the root walls. Then the nodule was rolled back and the mesial root was filled in the same manner.

In all operations Dr. Morrison stated it was his endeavor to accommodate the instrument to the case. In lateral incisors, for instance, where a dead pulp is diagnosed, an opening is drilled exactly on a line with the pulp-canal that will just admit the size of wire that is used for such canals, and no larger.

Dr. James S. Knapp, New Orleans. All will agree that a large amount of valuable tooth-structure is very frequently cut out in these cases; but he thought Dr. Morrison carried his views on the subject to the extreme. The opening of which he speaks is too small to permit effective work.

Dr. W. H. Morgan, Nashville, approved the idea of preserving as much as possible of the tooth-structure in the crowns of pulpless teeth, for just in the proportion that you cut it away do you lessen the probable length of the usefulness of the tooth; when much weakened it will become so friable as to break down in mastication. He inferred from Dr. Morrison's description that he proposed to make the opening of which he speaks round. It is much more difficult to fill properly a round cavity than one which is oblong or irregular in shape; and another objection to the round opening is the difficulty of seeing the work. He thought it would be better for this purpose if made slot-shaped. Dr. Morrison's next move—filling the canal immediately after destroying and removing the pulp—is, in the opinion of the speaker, radically wrong. This is the worst time to fill, because the fluids in the dentinal tubuli will necessarily decompose very rapidly. The contents of the tubuli should first be gotten into condition to prevent putrefaction, both in root and crown, by antiseptic treatment.. While we ought to save as much as possible of the crown we should cut out the root portion freely to get rid, as far as we can, of the material liable to putrefying processes. He approved of the method of filling which Dr. Morrison advocates, though he would prefer a wire with a screw on it, tamping with a permanent material like oxychloride. The only difficulty with this is that oxychloride is sometimes passed out through the foramen, if the foramen is not previously stopped. He indorsed heartily the suggestion as to the evil of cutting away so much of the dentine as we frequently find in living teeth. He had seen cases where the living dentine had been slaughtered in a manner that seemed like malpractice to him.

Dr. E. Parmly Brown, Flushing, L. I., disagreed with the essayist on one point,—his method of filling the canals,—and would not re-

commend that plan to students. He disagreed with Dr. Morgan as to the use of oxychloride, preferring gutta-percha instead. The least skillful can use this, and as soon as any of it passes through the foramen it will immediately notify you. Years ago he was in the habit of cutting away more good dentine and less weak enamel than now. Whether to fill canals at once after removing the pulps, is a question of care and correct diagnosis. He recalled the case of a lady who came under his care some years since. She said a German dentist had killed the pulps of ten teeth six months previous with arsenic. Most of the fillings were loose, and some of the pulps were suppurating. He took out all the dead pulps and filled the canals with gutta-percha the same morning, mummifying the pulps with oil of cloves and carbolic acid, equal parts. She had no inflamed face, and ten years afterwards her gums were as healthy as a baby's. Dr. Morrison is right in advocating the idea of making the opening as small as possible when cutting into teeth to remove dead pulps, and Dr. Knapp is wrong. Dr. Morrison looks ahead to see if he will have to remove the filling in case the pulp dies; if he decides that it will die, he puts in only a temporary filling.

Dr. Morgan replied that he proposed to do just what Dr. Brown advocated,—mummify the remains in the dentinal tubuli. In the case related by Dr. Brown very little antiseptic treatment was needed; but when the pulp has just been removed, the material is in the tubuli to putrefy, and it is against this contingency that we should provide. Where a pulp has been destroyed and suppuration has occurred we have only the débris to get rid of. Where the pulp has been freshly killed and extracted the fluids are certain to decompose, producing mephitic gases to give trouble, frequently causing abscess. There is no abscess except where there is decomposition. If you remove the material liable to be decomposed, you are safe from abscess.

Dr. Brown rejoined that he particularly objected to long treatment of roots. There are cases, of course, where, on the removal of a dead pulp, the roots should not be filled, but this can be determined by the character of the discharges.

Dr. Morgan could not see how you are going to have discharges to treat if you take the pulp out. If Dr. Brown has not had abscessed teeth to treat he is more fortunate than any one else who has practiced as long as he has. The abscess will come after awhile, in cases where the teeth are filled at once, if the patient lives long enough.

Dr. Spalding. We have heard various views expressed here, and both sides are right to some extent. It depends very much on the condition of the tooth. There are teeth which it does not do to fill at once. The speaker had removed fillings which had been put in at once on the removal of the pulp from the teeth of young patients,

and found them in the condition named by Dr. Morgan. As a rule he fills at once, but he ascertains that the canals are pure before he does so. It takes but a short time to do this. He uses bichloride of mercury for antiseptic treatment, a solution of 1 part to 1000 distilled water. You must be sure that your menstruum is pure, or it will antidote or decompose your medicament. If the canal is treated antiseptically you may safely fill at once. If the tooth is not in condition to make operating painful you may disregard wholly the state of the canal or the pericementum. A tooth which is filled after the extirpation of the pulp only becomes sore because gases get in; if you purify the canal you can go ahead and fill with safety, because no gases will be generated. In regard to filling root-canals, he thinks we must have a positive operation. If you use oxychloride or gutta-percha, and pump it in, you don't know that you have got it to the foramen, and, unless the interior is perfectly dry, you fail to get the chemical action to consolidate the agent. He used gold wires for filling root-canals thirty years ago, and had tried every method that had been brought forward, except the use of cotton, of which he had never been guilty. He pursues the method described by Dr. Morrison in shaping and adapting the wire. He estimates the length of the root and the depth of the canal, and gauges the length of the wire accordingly. That is shaped and adapted as nearly as it can be, and, instead of cutting off one-eighth of an inch, it is made just the length to the entrance of the canal. He prefers a gutta-percha solution for tamping it in, pumping it in as best he can, and breaking off the wire at the point indicated. This method is eminently satisfactory.

Dr. A. W. Harlan, Chicago, had noticed a lack of definiteness in the instruction which is offered. If we wish to be successful in these cases, in order to prevent decomposition of the contents of the tubules, to prevent abscess, we must be governed by some well-defined scientific practice. If a pulp is destroyed to-day and removed to-morrow, how soon will nature remove the eschar? Will it be to-morrow? No; it will require at least eight days. Now, does it not follow that that is the proper period to wait before filling? How should we remove it?—when the mouth is wet, or should we adjust the dam and keep the tooth perfectly dry? If we allow anything to get into the canal that we do not ourselves introduce, we will supply the proper conditions to cause future trouble. The proper treatment is to use something to abstract the water from the dentine. We will not have decomposition if we do that, and then hermetically seal the canal. If you don't fill such cases thoroughly well, so as to exclude air and moisture, you will have badly-smelling dentine, that you will cut out even

in young patients. There is no necessity for treating if you have removed the pulp. It is only necessary to abstract the water, for which purpose absolute alcohol is the readiest means.

With reference to the treatment of pulpless teeth, he would not permit an inflamed pulpless and suppurating tooth to be filled for him if there were not a fistulous opening. It would be too painful. When an abscessed tooth has a fistulous opening the necessity of treatment is not apparent. Any medicament will be sufficient, and he should fill the root at once.

With reference to cutting out the interior of a tooth, what is the necessity for weakening it, after you have gained access to the pulp-canal. He does not care what is used for filling the canal, except cotton, so that it is sealed perfectly. We talk about fitting gold wire and lead wire perfectly to the canal, but we depend on the plastic substance in which the wire is imbedded to fill up the irregularities. The average practitioner is utterly incapable of filling a canal with wire so as to be uniformly successful. A great many do not know how to use a plastic material; it hardens before they get it half way to the apex. In using gutta-percha the little cones should not be heated, but must be teased out to the smallest size that will permit them to retain their rigidity.

Dr. M. W. Williams, Hopkinsville, Ky., thought it was all wrong to treat these cases for two or three weeks, as is so frequently done. We should seal the apex (for which purpose he uses a lead point not more than one-sixteenth of an inch in length), and thus, as it were, close the door against deleterious influences; remove all surplus material in the root, thoroughly disinfect it, and, in a few days, we can fill with any material.

Dr. W. H. Richards, Knoxville, Tenn., thought the day was not far distant when the capping of pulps will be left entirely to those who don't attend the meetings of societies, or keep within gun-shot of proper practice. It is one of the greatest impositions ever devised. The results of this method of treatment are seen in dead teeth, in discolored teeth, in neuralgia and abscess, and even in general debility from foreign matters which find their way into the stomach. The worst feature of such troubles is that the patient, in his ignorance of the proper course, does not go to the dentist, but to the physician. The speaker is, therefore, opposed to capping the pulp, and prefers to take it out surgically. After extirpation he carefully excludes all foreign matters from the cavity, fills with cotton medicated antiseptically with carbolic acid for a few days, and in, say, a week it is ready for the permanent filling. Gutta-percha for this purpose, in his hands, is difficult to get satisfactory results from; oxychloride clogs; wires are apt to get through the foramen. He uses Robin-

son's fibrous material, which he dissects, and finds it composed of very fine threads. With a Donaldson nerve-bristle he carries up a little thread of the material and then another. In this way he can pack around a curve more successfully than by any other means within his knowledge.

Dr. Walker. There are many cases where you cannot use gold or lead wires, and in these cases especially gutta-percha gives the best results. He uses the material and the method which seems to be demanded by the case. He favors saving the nutrient function of the pulp as long as possible.

Dr. O. Salomon, New Orleans, believes in saving the pulp as long as you can. His practice is to cap exposed nerves and keep them under observation for a few days, but he does not use metal caps. Crude gutta-percha—not the prepared—is the best for the purpose, or you can make a pellet of artificial dentine and put to place. If there is no pain for three or four days you can go ahead and fill permanently, with hope of a good result.

Dr. J. A. Robinson, Jackson, Mich., would suggest the use of a spring broach to carry the material to the apex. If you take one of these and draw it over a stone to sharpen it it will carry the material perfectly. He believes it is impossible to fill successfully until the canal is thoroughly disinfected. If there is any odor, the presence of which is the best test of the need of disinfection, it must be removed, or the tooth may have to be extracted. We should use every means in our power to prevent the loss of the teeth. For thirty years he has insisted that no tooth should be removed that cannot be lifted out with the fingers. He caps pulps when that seems to be the best course to pursue. We sometimes deceive ourselves about this capping and are timid about it.

Dr. E. S. Chisholm, Tuscaloosa, Ala., has used, for capping pulps, creasote with oxide of zinc, first proposed by Dr. King in the Tennessee Dental Association. With these he uses oil of cloves. He has had thousands of cases, and is satisfied that there are many where the pulps have been living for ten years under that treatment. We should be conservative and eclectic with reference to the treatment of roots. There are instances where, when the pulp has been lost through devitalization or disease, quick treatment is the thing. The great point is correct diagnosis of the trouble we are dealing with, for there are other cases where slow treatment is beneficial. It does not matter what the canal is filled with so that it be thoroughly done. Not long since he accidentally cut his hand, and applied to it spirit of turpentine. The cut healed so kindly that he determined to test the efficacy of the remedy when applied to a bleeding pulp. The first trial was in the mouth of a young lady. An

exposed pulp was cut into, causing it to bleed; the spirit of turpentine was applied with excellent results. Since then he had tried it in two or three other cases, from which he had had no complaint. It would not be of benefit where there was suppuration, but in the case of fresh wounds it was worth a trial.

Adjourned to 2.30 P.M.

Afternoon Session.

Dr. B. H. Teague, Aiken, S. C., said that experience had taught him that there must be no pressure over a pulp which has been capped, and that the filling-material must be non-conducting. He has used Weston's cap over oxychloride in treating exposed pulps with satisfaction. Another good method is to dress with carbolized water; then flow oxyphosphate over the exposed pulp, and, after allowing it to harden, cover with a stratum of oxychloride, over which amalgam is placed. Patients should be enjoined to be careful of the tooth at first. A newly-capped pulp will not bear any great amount of mastication, nor any irritation.

Dr. W. J. Reese, Galveston. One of the most important points in the capping of pulps and the filling of root-canals is to see that there are no impurities whatever in the cavity. We want something that will be a sure test of the condition of the canals, so that we may know there are no impurities there, and we have that in permanganate of potash, one of the most convenient forms of which is Darby's prophylactic fluid. Put a broach wrapped with cotton saturated with this up the canal, and if it does not turn a brown color you may know that it is all right; but if it shows any impurities when withdrawn you may know that the canal is not fit to be filled. In capping pulps it is important to have the pulp in a healthy condition before it is capped. If a tooth, after having the canal filled, is sensitive to warm fluids, you may look out for trouble. If only sensitive to cold it may be all right.

Dr. McKellops, St. Louis, Mo. In opening into a dead tooth with a calcified pulp it depends upon the age of the patient how much and where the dentine should be cut away. Dr. Morrison, in his paper, spoke of an operation on a dead tooth with a calcified pulp—the nodule which was left in the cavity. He wished Dr. Morrison was present now to explain why he rolled the nodule to one side in the cavity while filling one root, then rolled it back on the other side while he filled another root, and so on, and what was the necessity of leaving that nodule in the cavity instead of removing it. He cannot see any object to be gained by leaving a foreign substance in the pulp cavity. We do not see all our failures in such cases, because patients sometimes become dissatisfied and go to others to

seek relief. In treating a pulpless tooth, if there is a fistulous opening and he can get through the foramen he can make a success. If there is a blind abscess to be treated there will be trouble as long as there is no fistulous opening. It is well enough to *say* go through the process and cut off the end of the root, or treat it—but how many are there who can perform such an operation successfully? Dr. McKellops instanced the case of a lady who was sent to him from another city, with a right superior central incisor which was dead, and discharging freely from a fistulous opening The death of the tooth had been caused by a blow. The case was treated for several weeks before a cure was effected and the tooth filled. It has since been under his observation for five years, and it shows no ill results. He also showed specimens of a case recently from this city. After treatment here failed, the patient went to a specialist in such cases in New York city. This case was that of a young lady with the right superior central and lateral incisors both dead. The operator in New York had removed, as he said, some sixteen pieces of necrosed bone from the process covering these teeth. When she came into his hands there was a fistulous opening between the central and lateral, about one-third of the lateral tooth being denuded. The patient was in poor health from constant suffering from these teeth, and a spot had appeared on the cheek which gave her considerable uneasiness. He took the fillings out of the roots, which he found were filled with gutta-percha and cotton, blood following their removal. After consultation with a surgeon, finding that there was no necrosed bone, he decided to extract the teeth. On doing so he found an opening on the labial surface of the root of each tooth about two-thirds of the way up, which had undoubtedly been made in attempting to drill out the pulp canal. Two weeks after removing the teeth the spot on the cheek and the abscess had disappeared, and the patient was in a fair way to recovery.

Now, as to filling roots, Dr. McKellops declared he had preached on that subject till he was almost ashamed to say anything more about it. Dr. Clark taught him the method of filling canals with gold on a broach, but he afterwards saw the gutta-percha method and was captivated with it. It is impossible to fit gold in canals which are too small to admit a broach, but you can put on the rubber-dam, and using a solution of gutta-percha in chloroform, with a broach you can inject it into every portion of the canal, even driving it out of the foramen; but even then it does no harm, while gold causes excruciating pain under such circumstances. The best method of taking the temper out of a broach to fit it for this purpose is to take about three dozen of the broaches, bind them together with binding wire, and then soap them well with common soap.

They are next placed in a small brass case about two and a half inches long by a half inch in diameter, holes being punched in each end, and the case carefully filled in with slaked lime, when the cap is to be placed on and the case heated to red heat; let cool, and the broaches will be found perfectly pliable and ready for use.

In separating teeth for filling, he uses waxed tape, for which thanks to Dr. Shepard, of Boston; and he finds that he can thus gain sufficient space without causing the patient unnecessary pain, and the teeth will be separated so that the operation can be proceeded with in from three to four days.

Dr. Teague. Is there any shrinkage in the gutta-percha root-filling applied by the method described?

Dr. McKellops. Only a small quantity is used, and there is no chloroform in it after the root is filled, as it evaporates at once.

Dr. Spalding. It has been said that where gold enters into the operation of root-filling the canal cannot be filled perfectly. No claim has been made that it can be. We all endeavor to close the apex, and it don't make much difference what material is used so that the foramen is sealed perfectly. How are you going to know when this is done? You can't drill out the whole length of the root, as we have seen examples here to-day. The process which he advocated is to use a plastic, but to be sure that you go to the foramen you manipulate the gold wire first. What possible harm can it do to introduce a cylinder of gold into the plastic material?

Dr. H. A. Smith, Cincinnati, wanted to emphasize what Dr. Harlan has said about the necessity of maintaining cleanliness during treatment. If we take a tooth with animal matter undergoing decomposition in it, every time we apply an antiseptic we make progress. But we must go further than this. We must isolate the tooth and exclude deleterious agents or we shall lose ground. We cannot have putrefaction without animal life. If we introduce cotton, that does not exclude fluids, through which animal life finds its way into the cavity.

Dr. J. Taft, Cincinnati. One or two points need to be emphasized which have been referred to in the discussion, but not sufficiently enforced. One is that the discriminating operator will note closely the peculiarities of the dentine he is operating upon. The tooth of childhood and youth contains a far greater proportion of organic material than in later life, and hence if this is decomposed in early life there is much greater liability to trouble—that is, in the nature of pericemental disturbance—than if occurring later. We find that in adult life the teeth of some are much denser than those of others. This depends upon the organization, the degree of calcification, and the relative amount of organic material in the teeth. If a tooth is

very firm and dense, we can take far more liberties with it than with one less perfectly organized. In teeth of the former class we may proceed at once with operations not admissible in the others. In some instances it is impossible to obtain success any way. We find some teeth which after devitalization remain for years apparently in as good condition as they were before devitalization; but others, especially the softer kinds and those of young persons, soon become discolored, because of the rapid decomposition of the animal matters in them. Sometimes this takes place without discomfort to the patient, and again in others very slight irritants may set up serious troubles. We must discriminate, and must not talk of the teeth as all alike. Then, again, the differences of health influences must be considered. Sometimes the teeth are just on the verge of serious troubles, and are easily toppled over by unwise treatment, and the differences of this nature can only be recognized by histological study of the differences in teeth. All these things it is competent for us to consider. The electric lamp is invaluable in enabling us to decide at once as to the nature of many troubles in the teeth. Some say cut away a great deal of the tooth-substance; others, as little as possible; but this must be determined by the character of the teeth.

Dr. Morgan. Dr. Harlan, in his remarks, seemed to go upon the supposition that there is no anastomosis between the tubuli of the cementum and the dentine. If you can absorb the water from the dentine and keep it out, of course it should be done. He wanted to emphasize especially the point that discoloration of the teeth is due to decomposition, and therefore just in proportion as you prevent decomposition will you prevent discoloration and disintegration. You can readily tell when you are at the end of the root when the canal is straight, but you cannot plug a crooked root with metal and succeed, unless you employ a method not known to the speaker. Nothing has been said about after treatment of pulpless teeth. Sometimes irritation is set up around them after they have been filled, but if you watch them closely, and treat by counter-irritation or by a saline purgative to keep the system in good condition, you will abort what, if neglected, may become a sort of forming abscess.

Dr. J. J. R. Patrick, Belleville, Ill. When doctors disagree you will usually find that it is not upon the facts upon which practice should be based, but upon the theory and practice founded on those facts. Every man will adopt a peculiar method of his own, but it seemed to the speaker that one or two points in the treatment of roots with fistulous openings have not yet been touched upon. There are two surfaces to the tooth, the internal and the external. The internal surface is nearly the form of the external,—that is, of a

tooth in normal condition. There is, of course, no rigid rule to go by as to external appearances, but whatever that may be the internal surface corresponds to it. He did not see how it was possible to fill a root perfectly with metal. To drill it out to make it of the form you want for that purpose is bad practice. He has seen many cases in which the wire has perforated the root,—one in which the end protruded a half-inch, and was worn for eight years without disturbance. He did not see how it was possible to know when the wire was the right length.

Dr. Morrison said that in his paper he had stated that when the wire passed through the end of the root it was but a moment's work to withdraw it and substitute another, which would stop just short of the foramen. He had seen some which passed through, but this occurred rarely. He would be glad to fill a root at the clinic on Friday by the method he had spoken of, if a suitable case presented, or he would demonstrate it in plaster.

Dr. Moore thought there was one point in Dr. Morrison's paper that should not beallo wed to pass unchallenged,—with relation to not cutting away the dentine. In speaking of the treatment of the canals of lateral incisors, he says he simply makes a very small opening on the line of the canal,—only sufficient to admit the wire which he uses to fill it. Dr. Morrison may be able to clear out the débris and fill up the canal perfectly through such an opening, but the majority of us are not. Many of us in attempting an operation after this method would fill the canal, leaving organic matter within, which would decompose and in time discoloration would be found.

(To be continued.)

AMERICAN MEDICAL ASSOCIATION.—SECTION ON ORAL AND DENTAL SURGERY.

The thirty-sixth annual meeting of the American Medical Association was held at New Orleans, commencing Tuesday, April 29, 1885.

The Section on Oral and Dental Surgery held its sessions in Grunewald Hall.

First Day.

The Section was called to order at 3.30 P.M., by Dr. John S. Marshall, of Chicago, who stated that the chairman, Dr. Allport, was prevented from attending by illness. On motion, Dr. Jacob L. Williams, of Boston, was elected temporary chairman, and Dr. John S. Marshall secretary *pro tem.*

On motion of Dr. A. E. Baldwin, of Chicago, the dentists of New Orleans and vicinity were invited to attend the meetings and participate in the discussions.

Dr. John S. Marshall read a paper entitled "Cocaïne in Dental Surgery," of which the following is an abstract:

After alluding to the disappointment which many dentists have experienced in the use of hydrochlorate and oleate of cocaïne for obtunding sensitive dentine, in which direction it was at first hoped the new local anesthetic would prove of the greatest benefit, the paper called attention to a form of the drug which had been recently introduced, viz., the citrate, which seemed to promise better results in dental operations than had been attained by the hydrochlorate. The writer had experimented carefully with the hydrochlorate, the oleate, and the citrate, and the paper detailed the method of application, and the results arrived at in the first ten experiments with each of the three preparations. Of the experiments with the hydrochlorate reported, eight were for testing its efficacy as an obtundent of sensitive dentine, one for diminishing the pain of operating for pyorrhea alveolaris, and one for devitalizing a sensitive pulp. In one case where it was used as an obtundent, it was successful, as also in the case of pyorrhea; but in all the other exeriments it was more or less a failure.

In the oleate experiments a five per cent. solution and the normal oleate were used. Of the experiments with the oleate, six were upon sensitive dentine, two for extraction of abscessed teeth, one preparation of root for artificial crown, and one extirpation of pulp. In every case except the operation for the artificial crown, which was rendered painless by the oleate, there was more or less of failure.

The citrate used in the experiments detailed was prepared by McKesson & Robbins, at the request of Dr. Marshall, who had it made it up into pills, each containing one-fourth grain of the drug, the excipient used being gum tragacanth dissolved in glycerin. The method employed for the exhibition in cases of sensitive dentine was to clear out the cavity of loose débris and wash out with tepid water; then adjust the rubber dam and apply one-sixteenth or one-eighth of a grain of the citrate, according to the size of the cavity (the pills being halved or quartered for the purpose), placing over it a pledget of cotton saturated with tepid water. The excipient soon dissolves and flows over the surface of the cavity, distributing the drug in every portion of it. In five minutes the dentine is tested, and, if necessary, a second, or even a third, application is made. Some pain is usually felt by the patient on the first application of of the drug, but this passes away in from two to five minutes. In eight of the ten experiments detailed the application was for obtunding sensitive dentine, with entire success in all except one, where the result was only partially successful. The ninth experiment with the citrate was a case of pulp-extirpation, and the tenth was an

application for the relief of odontalgia with pulp-exposure. In the former the extirpation was accomplished without causing pain; in the latter the result was *nil.*

The experiments related were in each instance the first ten cases occurring in the practice of Dr. Marshall where the various preparations named were used. He has since tested the merits of the citrate more thoroughly, and it has been successful in nearly every instance when used as an obtunder of sensitive dentine, for which purpose it seems to be more reliable than either the hydrochlorate or the oleate, and it acts more promptly.

Dr. G. J. Friedrichs, New Orleans, was satisfied that neither the hydrochlorate nor the oleate was suited for obtunding sensitive dentine. In regard to the way in which cocaïne produces its effects, it has been demonstrated that what causes the pain on the application of other obtundents is the rapid absorption of the fluids in the tubuli, notably in the use of alcohol and the much vaunted Näbolï, the active principle of which is tannin. It may be that the affinity of the citrate for water is the reason why it produces better results.

Dr. Walker's experience has been confined to the four per cent. solution of the hydrochlorate. Sometimes the results were satisfactory, and sometimes not. He had used it in some cases of extraction, but had little to hope for it in this direction, except by hypodermic injection.

Dr. A. E. Baldwin, Chicago, had had no experience in the application of cocaïne to sensitive tooth-structures except with the muriate, and his experience was so nearly in accordance with that of Dr. Marshall with the same form that it would be but a repetition to relate it. In one case where he was excavating a left superior lateral incisor for a lady who was extremely nervous, and the tooth sensitive, he determined to try the effect of the application of a little chloroform to the gums. In reaching for the chloroform bottle, he accidentally picked up a vial containing ether, with which he saturated a pledget of cotton which he placed on the gum as near the end of the root as he could. The application caused pain, but after a few moments he was able to excavate without discomfort to the patient. He had used the same method in two other cases with very appreciable lessening of sensibility. In regard to the application of arsenic, he considered the one-hundredth of a grain just as good as a grain. The escharotic effect is what we are after, and to produce this requires only a very small quantity. It is a common error to use entirely too much and thus add to the danger. He had seen cases where particles of the drug got on to the gum, causing a bad condition. To prevent this, after sealing the arsenic in the cavity the best he can, he applies dialysed iron to the gum and adjacent tissues.

This will neutralize the effect of any portion of the arsenical preparation which may escape from the cavity. But if you only apply one-hundredth to one-fiftieth of a grain you need have no fear of disastrous consequences, even if the patient should swallow the whole of it. He thinks the good results with cocaïne are largely due to the care with which it is applied and to the condition of the system, especially the circulatory system. In cases of partially obtunded dentine it is reasonable to suppose that the effect will be less than when the dentine is in a robust condition. If Dr. Marshall had discriminated a little more as to the condition of the teeth and the extent of the decay at the time the applications were made, his report would have been more valuable.

Dr. Friedrichs thought that the grounds taken by Dr. Baldwin would not be sustained by the experience of old practitioners. We know that the most sensitive cavities are those of little depth; the amount of decay has nothing to do with it. As regards the healthy pulp, if exposed, it is not sensitive, in the speaker's experience. As an instance, a dumb boy, twelve years of age, fell and broke a tooth which was perfectly sound and the pulp healthy. The pulp, which was exposed, was touched with an excavator without the boy's feeling it. It is only when the pulp is irritated that it is sensitive, and that is the time when you want your local anesthetic to act. A patient of his had suffered for twenty four hours from odontalgia in a tooth with exposed pulp which he had previously filled in the hope and expectation of saving it. He whittled a piece of hickory stick down to a point, drove it into the pulp, and twisted it off. For a moment the patient was as if paralyzed, but the sensation quickly passed away, and he had immediate relief from the toothache. The stick was left there, now five months, and the case has not been heard from since. This plan is similar to Dr. Richmond's, but the hickory, when condensed as supplied for pivots, is better than the orangewood used by him. The mere effect of the use of cocaïne is sometimes deceptive, and is not constant in the same mouth. When he first got the hydrochlorate he used it in some cavities he was preparing with perfect success, while in others on the opposite side of the same mouth, after fifteen or twenty minutes there was no effect. How are we to account for this?

Dr. Marshall. How old was the solution used?

Dr. Friedrichs. Not over a week.

Dr. Baldwin said that the idea he had advanced was given only as an opinion, and not as a fact, but his opinion still remains unchanged. He was surprised to learn that a healthy pulp when exposed is not painful. He meant to say when he spoke before that the applications mentioned were anesthetic in their effects or not, ac-

cording to the action which they have on the nervous tissues of the pulp, the gum, or the mucous membrane. If there were no terminal fibers there would be no sensitiveness.

Dr. Louis A. Thurber, New Orleans, said that his experience with the hydrochlorate of cocaïne had been very favorable. Many failures, in his opinion, have been due to the fact that operators have allowed the solution, however strong, to be washed away by the fluids of the mouth before it had the opportunity to act. His plan for preventing this is to adjust the rubber-dam, before applying the drug, and he had never had a failure since he adopted this procedure. He had also used it once or twice for extraction, but he must say he found it difficult to get it to the proper place, and he would not recommend it for this purpose, though he considers it invaluable in excavating dentine and in treating the gums.

Dr. Oscar J. Coskery, Baltimore, had used cocaïne only once, for toothache. One application quickly removed the sensitiveness.

Dr. Williams has had varied experiences with cocaïne, and also with other remedies, for obtunding sensitive dentine. He has known chloric ether to obtund sensation; also, chlorate of calcium, and tannin, which last he has used for thirty years. He has used cocaïne in two per cent., four per cent., and thirty per cent. solutions, and he thought at first it might be relied on in young and soft teeth. In a case where a tooth with decay was broken off, he drilled in the direction of the pulp and found sensation. He applied cocaïne and went on without discomfort for a short distance, when the pain recurred; again applied the cocaïne and drilled further. When the pulp was reached it was very sensitive. He supposed he might have gone on in the same way to obliterate the pulp entirely, but time did not permit, and he employed the usual arsenical preparation. Before commending cocaïne unqualifiedly he should want to make more experiments, and be more mathematically exact about the strength and quantity of the preparation used.

Dr. Friedrichs wanted to call attention to the fact that in the case described by Dr. Williams there was a lesion in the tooth and the pulp was irritated, while in the case related by himself the tooth was sound and the pulp healthy.

Dr. Marshall, in reply to a question, stated that in his experiments the action of the drug on hard, dense teeth was slower than in the softer classes, but he got the same effects. After making some failures with the hydrochlorate, he had tried the citrate successfully in the same class of cases. He had used the hot-air blast in connection with the cocaïne, and observed no special difference in the results. In his experience also there seemed to be no difference whether the rubber-dam were used or not, with the hydrochlorate or the oleate.

His solutions were fresh when he got them, but at the end of a few weeks he found a fungoid growth in them, and after this growth was observed their efficacy was gone. The oleate was not originally intended for use upon the teeth, but for external application. Normal oleate contains from 48 to 52 per cent. of the alkaloid. Messrs. McKesson & Robbins now prepare the citrate in the pillular form of which he had spoken. He thinks its effect upon mucous tissues is not so pronounced as that of the hydrochlorate, but upon the dentine its effect is more profound.

Dr. Jacob L. Williams, Boston, read a paper entitled "A Suggestion on the Proper Alternation of Rest with Effort," which enforced the idea that continued exertion without proper intervals of rest will result in premature giving out of the capacity for work. In the performance of long operations the eyes will become fatigued, rendering it difficult and unsafe to continue. In such case it is well to raise the eyes from the work and let them rest for a short time on a distant part of the room; better, if you can leave the operation, step to the window, and look out for a minute or two. In either case the eyes will be refreshed and re-invigorated. Mere exercise long continued carries fatigue to exhaustion, which is but another name for weakening or debility. Patients, also, are too often allowed to suffer a continuance of strain on their powers of endurance which requires days to recover from. The rule should be to rest, if possible, just when we are tired, and to allow our patients to do the same.

Discussion was deferred, and the Section, after agreeing to report to the Nominating Committee the names of Dr. John S. Marshall, Chicago, for chairman, and Dr. A. E. Baldwin, Chicago, for secretary, adjourned to meet to-morrow at 3. P.M.

Second Day.

The Section met pursuant to adjournment.

Dr. Oscar J. Coskery, Baltimore, read a paper descriptive of a case of fibroid sarcoma. The paper was accompanied by a cast of the face before the operation, by plaster models of the mouth, by photographs and photo-micrograph slides showing the microscopical appearances, and by the tumor itself. The swelling, which had first been noticed about two years previously, at the time the patient came under treatment involved the whole of the left lower side of the face, the tongue being pushed over to the right, where it rested in a sort of sulcus, and the articulation of the teeth was entirely destroyed. Shortly before this time an enlarged gland made its appearance in the left submaxillary triangle, which frightened the patient into seeking relief. The operation, which was performed under

chloroform, consisted in removing the left lower maxilla from a point just to the right of the symphysis to its articulation with the temporal bone, and the enucleation of the enlarged gland. The boy did well from the first, and was discharged from the hospital May 6, 1882, twenty-one days after the operation, with only one suppurating point, which was left open for drainage, and with very little deformity. The microscopic investigation showed the tumor to be a true fibroid sarcoma or recurrent fibroid of Paget.

Dr. Coskery, in reply to an inquiry, stated that it was the only case of fusiform sarcoma which he had seen, but there are some epulic growths which resemble it. Myeloid tumors are more common, and the cystic variety the most common of all. The fibroid sarcoma is barely mentioned in some of the authorities, and not at all in others. He had heard from the case during the last summer, and there had been no recurrence of the trouble.

Dr. Baldwin had one question as to the permanence of the relief afforded. Dr. Coskery has said there was no return of the disease in two years, which may be regarded as strong evidence that there would be no recurrence, but in general he should fear that sarcomatous infiltrations might be left in other portions of the tissues. We should not attempt to save too much structure, but should cut boldly, so as to be sure that no infected territory is left, as a very small portion of infiltration will cause recurrence. We should be sure that we take enough away. Nature will reproduce more than we take away, as in this case.

Dr. Walker showed a number of casts of cases of irregularity which had occurred in his practice and described the methods of treatment.

The subject of the paper read on the previous day by Dr. Williams was declared open for discussion.

Dr. Baldwin. It is an extremely trying position for the eye to be occupied at such close observation for so long a time as is usual during many dental operations. The hearing of the paper will lead him to rest his eyes more at such times than he has heretofore done. He finds that many dentists have trouble with their eyes, which they ascribe to the direction of the light over their chairs, but he thinks that if they would pay more attention to resting the eyes, as suggested in the paper, it wouldn't make much difference about the direction of the light.

Dr. Williams has always had his chair so located that he could look out of a window, and thus give a change to the focus of the eye as well as to the objects it looked upon, and he has practically proved the correctness of the position he had taken in the paper. There is no irritation, no weakness of his own eyes, which he ascribes to

his having always pursued the plan of resting them at intervals as suggested.

Dr. Marshall. There is probably no other class who tax their eyes as dentists do, and no other who have as poor eyes, of which fact many are unaware. He himself was probably born with astigmatism, but he never discovered the fact till about five years since. Happening in an optician's office, he was looking at the lines with which the powers of vision are tested, and he observed that some of them looked blurred. He immediately recognized the fact that he had astigmatism, and called upon an ophthalmologist who told him that he had always abused his eyes, and the wonder was that he had not lost his sight from irritation of the nerves. Glasses were supplied, and within a week he saw the relief they gave him. He has now a constant mechanical rest, and severe attacks of neuralgia, to which he was formerly subject at short intervals,—every few days,—have almost ceased to trouble him. Dr. Williams's suggestion to rest the eyes occasionally during operations is good advice to dentists, but above all things let them know whether their eyes need treatment or the aid of glasses. He believes that if the eyes of the practicing dentists were examined a large majority would be found to have defective sight; and that many who have head troubles of the kind that formerly made life a burden to him would find on investigation that the cause was in their eyes.

Dr. Williams. It is a common supposition that a change of occupation is rest. Change is refreshing, but absolute cessation from exertion is rest. To fix the eyes for a time upon one object and then upon another does not rest them. His plan, which is better, is, when he desires to rest his eyes, to let them wander, without effort to fix them upon any object. There is a vast difference between changing the application of the energies and absolute cessation from effort. Whenever we make any application we put forth some effort. When a man, after a day's work at operating, goes to write or to arrange his instruments he draws on his vitality, and he will find his endurance at an end in time. There are certain periods which are more fatiguing to the eyes than others; probably the morning hours are more exhausting than later in the day. The manifest admonition is to let your work begin as the day begins, gently.

Dr. Walker. There are times when repose is rest; at other times it is very far from it. If a man stands at the chair for hours and exhausts his nervous force, his rest does not consist in repose. A different occupation or violent exercise would be rest for him. In regard to the use of the eyes, one of the greatest mistakes made by dentists is to have too much light or too many lights. At one time

he found the light too glaring, and he had the walls of the room painted a dead color, and took measures to control the admission of light, so that he could reduce it if too strong, and to develop or direct it to the point he wished to see without the confusion caused by a glare.

Dr. Williams. If you operate by too strong a light the eyes will give way sooner than if you have a proper illumination. Too much light will obtund the sensitiveness of the optic nerve, and those who have a strong southern light—what may be called a flood of light—will thereby injure their eyes sooner than those who use it temperately. Students at college go out and row or take other violent exercise. They may refresh their brains, but they forget they are human and have not an inexhaustible supply of vital force. We must have periods of absolute repose. The point he wished to enforce is that the idea is not correct that we always get rest by a change of occupation.

Dr. Baldwin thought the scope of the paper wider than the discussion seems to indicate. It reaches out to prescribe a rest for patients. He had found, when in the practice of medicine, a very nervous, irritable feeling come over him at times which it required considerable exertion to control. To any who are afflicted in a similar manner he would recommend bromide of potassium, thirty to sixty grains in solution. After taking it the nervous irritability will pass rapidly away. He has recommended irritable patients to take twenty to forty grains of the bromide an hour or two before coming to their next appointment, and it has produced a feeling of comparative freedom or ease.

Dr. Walker. The student who takes no exercise will be dull, while he who takes too much will exhaust his resources, but he must have enough of it to keep his system in proper condition.

Dr. Smith, Honolulu, S. I., thinks that most persons are governed in the use of their eyes by the strength of the eye and habit. Some can use their eyes constantly for a long time without failure of the optic nerve, while others cannot. Up to the time he used glasses he had no trouble with his eyes, but as soon as he adopted them his eyes began to get tired, because there was only one focus for them. Many who have no regard for the laws of optics read with a very bright light shining directly in the eyes. His practice has been to get his light from above, and from one direction. If very fine print seems to run together after reading awhile, by looking away from it a short time the eyes will be invigorated and you will see clearly. He has often queried whether the practice of dentistry were not hard on the eyes, and his impression is that dentists' eyes fail sooner than those of almost any other class.

Dr. Williams. The engraver and watchmaker use artificial aids for vision in their work. Dentists should also use them instead of reflecting mirrors.

Adjourned.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

The regular meeting of the Odontological Society of Pennsylvania was held Saturday evening, February 6, 1885, at the residence of Dr. Daniel Neall, No. 1627 Summer street, Philadelphia.

Dr. Chupein was called to the chair.

Incidents of Practice.

Dr. G. Roberts. I present a model of a case of irregularity which has recently come into my hands. The patient is a young man, aged nineteen. In the upper jaw the left lateral has erupted inside and the cuspid outside of the arch; the right lateral has been extracted, and the space has closed perfectly. In the lower jaw there is a generally irregular condition of the six oral teeth. I will advise the extraction of both laterals; then the teeth will straighten themselves. If the case was that of a lady, I would extract the first bicuspid; then both cuspids would have to be forced back, and the upper lateral forced out, which would be very easy to do; but young men in business will not always submit to this treatment.

Dr. Register. Considering the age of the patient, I would take out the left superior cuspid and force the lateral into place, after which I would cut off the inner cusp of the first bicuspid to make it look like a cuspid.

Dr. D. Neall. I would gain room in the lower jaw by taking out one of the incisors and the left first bicuspid, after which the remaining teeth could be readily brought into line. In correcting the upper jaw I would extract the left lateral, and then draw down the cuspid.

Dr. Bonwill. I know nothing of the Herbst method of filling teeth, but from my knowledge of mechanics I have no doubt that by keeping the instrument used absolutely bright, so that it shall cause little or no friction, the gold can be condensed so as to be beaten into plate. This might do well in some cases, but when it comes to filling all the different forms of cavities in all the various positions in which we find them, I do not see how it is possible for it to meet all the conditions. I think it is only another illustration of what we often see. Dr. Herbst has made a hobby of filling teeth in this way, and has studied its possibilities, and he can probably do more with the method than any one else. In regard to the use

of the matrix (which is part of the system), any one who is at all conversant with the facts must know that it is in many cases impossible to adjust one. It will do in approximal cavities, where there is plenty of room, or where it can be put in tightly, but when you have to carry it out on the buccal or palatal surfaces and get at the angles, its use becomes impossible. As to the mere rubbing together of two pieces of gold so as to make them cohere, any one can do that with an ordinary burnisher; but to get the gold into all the little pits, or to build a contour operation that will stand, you cannot do it in this way. As regards speed, Dr. Bödecker, who went to Europe and studied Herbst's method thoroughly, took with him the Bonwill electrical and mechanical mallets, but Herbst beat him in time. In their tests it was determined that you could not pack more gold in a given cavity by this method than with the electrical or mechanical mallet. Long ago I proved that there can be packed one-sixth more gold in a given cavity with the electric than with the hand or any other mallet. I have not the exact figures by me, but I have packed approximately two books of foil in one hour and twenty minutes with the electrical mallet, and one book in thirty-five minutes with the mechanical mallet. Why do we want greater speed or more solidity in a filling than this? One reason why so much praise has been bestowed on the Herbst method is that European dentists have never before given to the profession anything of value in this direction, and they are disposed, therefore, to make the most of their contribution. Had Dr. Bödecker been as familiar with the electric or mechanical mallet as I am, there would have been no such result as indicated by him.

Dr. Dixon. A lady about sixty years of age fell, some two years since, breaking off the lower third of the right superior lateral incisor and loosening the adjoining central. After her recovery the central was so elongated as to quite disfigure the patient. It was forced into its proper place by the application of a fixture prepared for the purpose. But upon removal of the pressure, which had been maintained for six months, the tooth in a few hours returned to its unsightly condition. The fixture was then returned and retained until the tooth was again forced into place. I then bored a small hole in the approximal surface upon a line a little below the fractured end of the lateral. Into this hole I fastened, with gutta-percha, a small piece of gold wire, extending some two-thirds across the fractured end of the lateral, upon which I built firmly a gold filling, restoring its contour. This was done some six months ago, and the central has been held perfectly in its place.

Dr. Register. Was there any pyorrhea?

Dr. Dixon. There was some absorption around the mesial border of the neck, but no considerable pocket.

Dr. Bonwill. I am reminded by this case of some experience I had in placing artificial crowns, which satisfied me that, if you do not allow it to come in contact with an opposing tooth, the root will elongate, unless the pericementum can be kept normal as before the death of the pulp. But a band or a poorly-fitting crown will act like a rubber band, and gradually force out the root.

Dr. Register. A patient of mine, a boy, inherited from his father a peculiar type of jaw and teeth. The father's upper anterior teeth project so far that the lip does not cover them, and even though he wears a large moustache, the teeth are seen all the time. In occlusion the incisors of the lower jaw strike into the gum behind the superior incisors. The oral teeth are abnormally long, while those from the bicuspids to the last molars are unduly short. The little boy has teeth of the same character, only the deformity is intensified. When he was first taken in charge his upper incisors projected at an angle of forty-five degrees, so that they hung over like the incisors of a sheep. I had talked with others about the case at the outset, and they discouraged any attempt at interference. The deformity was inherited, they said, and the teeth would be sure to return to their original positions when the force which held them was removed. Nevertheless, I have undertaken to remedy the difficulty, and have been working to that end nearly three years. My idea was that to insure success I would have to break up the continuity of the tissues and make a new process. The first permanent molars were just through the gums when the treatment was begun, and yet they appeared to be fully erupted. I knew I could not get articulation unless I could by some means make the other teeth which were to come grow to a greater length. The upper incisors were first brought into proper position by means of a rubber strap, having a silk loop at each end. This apparatus afforded ample opportunity for cleansing the teeth readily. It was put on loosely at first, and tension was made as required. The treatment of the lower incisors, which in occluding cut into the gum behind the upper teeth, was commenced. I cut off the cutting edges slightly, at short intervals, until they began to feel sensitive, when I would desist for a fortnight or more, after which, the sensitiveness having passed away, I would resume. Finally, they were got into position. Of course the lower teeth were somewhat shortened, but they articulated nicely with their antagonists, and altogether presented a good appearance. A crib plate was then constructed, and it was extended back over the molars so as to keep the mouth open a quarter of an inch. As the temporary molars

were gradually lost, I found that the bicuspids were growing, or, perhaps better, lengthening, proportionately. My opinion is that, unless some such means as has been described had been adopted, they would not have been as long as they now are by one-third. The bicuspids are now about fully erupted, and it is my intention to take off the crib plate and extract the first permanent molars, and then put on a T retaining plate, which will be worn six or seven years. The boy is now ten years old, and I think there will be good occlusion of the teeth. The enamel seemed perfect, and, though the teeth were so loose at one time while they were being moved that I believe I could have taken them out with my finger, they are now firm and well set. The rubber straps were adjusted by making cavities in the buccal surfaces of the second temporary molars, into which small pins were built, and these were used as bases in pulling the teeth into place.

Dr. Bonwill. Where the teeth are so much displaced, especially if they are of a "type," they will go back to their original position when the fixtures are removed. When the irregularity is acquired this does not occur. While practicing in Delaware I had a case of irregularity caused by thumb-sucking, where the deformity was so great that you could put two fingers between the incisors of the upper and lower jaws when the mouth was closed. It was readily cured, and there was no return to the former state. But in the type cast it will return again, or is far more liable to do so.

Dr. Dixon. What is a "type"?

Dr. Bonwill. I know only one definition. Dr. Register says the father's teeth and jaw are of the same character that he finds in the child, only in the latter the abnormality is intensified. That is a "type."

Dr. Dixon. I have seen teeth regulated where the type, I believe, had prevailed for generations. If the operation is performed gradually, the process is not absorbed, but follows the teeth. If commenced when the patient is about thirteen years old, the age which I prefer taking them in hand, and continued for a year or more, it will succeed.

Dr. Bonwill. Dr. Kingsley has done as much in the way of regulating teeth as any one here, and his experience, as recorded in his "Oral Deformities," is that when the malposition is typal the teeth will return in time to their old positions, and he will not touch a case that is typal with the expectation of making a permanent success of its regulation. It is only those cases where the deformity results from mechanical causes, as thumb-sucking, injudicious extraction, accident, etc., that can be successfully treated. Such is my experience.

Dr. D. Neall. Where the irregularity is of mechanical origin it can be corrected by mechanism, with nature back of it. When you have the angular jaw type, the teeth will go back after being regulated. Where you have the rounded arch you can correct permanently.

Dr. Register. I believe that disease might become a type. The grandfather* of the child whose case I have just described had nothing in the way of dental deformity; but his son acquired a malformation of the jaw in some way, and now the child of that son shows the same deformity intensified. I believe I can change this, and if I can maintain the new conditions long enough,—until nature, so to speak, begins to recognize the new parts,—the change will be permanent and the teeth will not go back.

Dr. Dixon. If constant pressure is placed upon a growing structure, like that of the developing human jaw, and firmly maintained in its changed position until new granulations have taken place, it cannot go back.

Dr. Tees. If the anterior teeth have been kept in their abnormal positions by an insufficient length of the bicuspids and molars, and if Dr. Register has elongated them. I should think the treatment ought to be successful. In regulating, the tooth is moved away from one of the plates of the alveolar process. If, with the forceps, we move a tooth violently backward or forward, we may fracture one of the plates; but if it is moved slowly, as in regulating, the process will move with it.

Dr. Register. I think that the full meaning of Dr. Bonwill's definition of what constitutes a "type" was not fully appreciated by all who heard it,—that is, the idea that from conception there is a type of the future being formed; that this type is persistent, and that there is a constant tendency under all changes to go back to the original idea from which it grew. I believe that, where the changes are forced for years, what we may call a secondary nature is formed. In pursuance of this idea the patient whose case I have described should wear the plate all his life, if necessary, taking it off occasionally and re-applying it if the teeth show any tendency to go back.

Dr. Bonwill. Many years ago I encountered certain difficulties in placing teeth in proper articulation by means of the instruments in use at the time. I found that the lower human jaw was very nearly a perfect equilateral triangle, about four inches on each side. I also observed that the curve at the ramus varied with the bite of the natural teeth, and investigated the reason for it. Based on these

* Have since learned that one of the grandparents had just such a dental deformity.

studies. I invented an anatomical articulator. You will find that most dentists articulate teeth only on the outer cusps, but if you will look at nature you will see that the teeth are articulated on the inner cusps as well as the outer ones. The practical application of this articulator shows how nature has predetermined not only the various shapes of teeth,—their sizes, length, width, and thickness,—but also the varying lengths of the cusps on all,—the depth of the over-bite, the curvature of the teeth at the ramus, the sizes of the arches and their depth, as well as the expression. It is in this connection that I now speak of it to illustrate how nature will follow a predetermined course, whether it be normal or otherwise, which is difficult to change, except through several generations; you can modify, but seldom correct, the deformity in the living subject.

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At the annual meeting, held May 2, 1885, the following officers were elected to serve during the ensuing year:

Edwin T. Darby, president; Henry C. Register, vice-president; Ambler Tees, recording secretary; H. K. Leech, corresponding secretary; E. H. Neall, treasurer; W. G. A. Bonwill, librarian; E. C. Kirk, T. F. Chupein, and J. W. Noble, executive committee.

ALUMNI DENTAL DEPARTMENT, UNIVERSITY OF PENNSYLVANIA.

The fifth annual meeting of the Society of the Alumni of the Dental Department of the University of Pennsylvania was held in the medical hall of the university, Philadelphia, April 30, 1885.

The society adopted the code of ethics of the American Dental Association. The officers elected for the ensuing year are as follows: Geo. L. Curtis, president, Syracuse, N. Y.; H. C. McClure, first vice-president, Coatesville, Pa.; C. J. Peters, second vice-president, Syracuse, N. Y.; J. H. Campbell, third vice-president, Media, Pa.; J. R. Yorks, corresponding secretary, Philadelphia; C. T. Howard, recording secretary and treasurer, Rochester, N. Y.; H. L. Reinecke, orator, Pittsburg, Pa. Executive Committee: L. Foster Jack, chairman; H. B. McFadden, J. H. Noble, and Louis Shaw, Philadelphia; F. W. Fisher, Syracuse, N. Y.

Chas. T. Howard, *Recording Secretary.*

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The second meeting of the National Association of Dental Faculties will convene at the Sherman House, Chicago, on Friday, July 31, 1885, at 11 A.M. It is desirable that there shall be a full representation of all the faculties. H. A. Smith, *Secretary.*

NEW HAMPSHIRE DENTAL SOCIETY.

The ninth annual meeting of the New Hampshire Dental Society will be held at Concord, on the 16th of June, 1885. All members of the profession are invited to attend.

The Board of Censors will meet on Monday evening, the 15th, at Phenix Hotel, at seven o'clock, for the examination of candidates for license to practice.

Edward B. Davis, *Secretary*,
88 North Main street, Concord, N. H.

UNIVERSITY OF PENNSYLVANIA—DEPARTMENT OF DENTISTRY.

The annual commencement of the University of Pennsylvania, including the Department of Dentistry (sixth commencement), was held at the American Academy of Music, Philadelphia, on Friday, May 1, 1885.

The valedictory address was delivered by Professor D. Hayes Agnew, M.D., LL.D.

The number of matriculates for the session in the Dental Department was one hundred and twelve.

The degree of D.D.S. was conferred upon the following members of the dental class by William Pepper, M.D., LL.D., provost of the university:

NAME.	RESIDENCE.
William Y. Allen	Massachusetts.
Edgar C. Bailey	Georgia.
Edward R. Bellis	Indiana.
F. W. Bromley, M.D.	Wisconsin.
Augustus Bruns	Germany.
Ditson P. Carter	Ohio.
William S. Couto	Brazil.
Ira B. Crissman	Illinois.
Chas. Elmer Dayton	Connecticut.
George W. C. Dick	South Carolina.
Edward B. Dickinson	Massachusetts.
Robert Fulton Ehni	Ohio.
Geo. Ægidius Englert	New Jersey.
George W. Erskine	Pennsylvania.
Oswald Fergus	Scotland.
Frank W. Fisher	New York.
Andreas Fridman	Sweden.
Clifford Gibbons	England.
John F. Gibbons	England.
Louis Ginoyer	Brazil.
Thaddeus T. Hayward	Minnesota.
John C. Hertz	Pennsylvania.
Edward D. Howe	New Hampshire.
A. C. Hugenschmidt	France.
L. Foster Jack, M.D.	Pennsylvania.
Victor S. Jones	Pennsylvania.
Frank C. Knapp	New York.
William R. Long	Pennsylvania.
Adelbert W. Marsh	New York.
Charles J. Mercer	Pennsylvania.
George G. Milliken	Pennsylvania.
Charles T. Millikin	California.
Grafton Munroe	Maryland.
Edwin G. Parker	New York.
Edwin Peardon	Wisconsin.
Clarence F. Roett	Barbadoes, W. I.
Jose Roque	Cuba.
George B. Ryan	Canada.
John A. Schmidt	New York.
Louis Shaw	Pennsylvania.
Chas. Elmer Smith	Iowa.
W. Albert Smith	Colorado.
Claude A. Southwell	Wisconsin.
Ernest L. Southworth	California.
J. Walter Stapleton	Kentucky.
R. Walter Starr	Pennsylvania.
Henry M. Stine	Pennsylvania.
George H. Wells	Massachusetts.
William L. Winner	Pennsylvania.

PENNSYLVANIA STATE DENTAL EXAMINING BOARD.

The Pennsylvania State Dental Examining Board will hold its next meeting during the session of the State Dental Society, at Cresson Springs, beginning Tuesday, July 28, 1885. Candidates for examination are requested to be present on the first day of meeting, and promptly call on the president or secretary.

Henry Gerhart, *President.*
J. C. Green, *Secretary.*

EDITORIAL.

MINNESOTA DENTAL LAW.

The following is the text of an "Act to insure the better education of practitioners of dental surgery and to regulate the practice of dentistry in the State of Minnesota:"

Be it enacted by the Legislature of the State of Minnesota:

Section 1. That it shall be unlawful for any person who is not at the time of the passage of this act engaged in the practice of dentistry in this State to commence such practice unless he or she shall have obtained a certificate as hereinafter provided.

Sec. 2. A board of examiners, to consist of five practicing dentists, is hereby created, whose duty it shall be to carry out the purposes and enforce the provisions of this act.

The members of said board shall be appointed by the Governor, who shall select them from ten candidates whose names shall be furnished him by the State Dental Association; at least three members of said board shall be members of the State Dental Association. The term for which the members of said board shall hold their offices shall be five years, except that the members of the board first to be appointed under this act shall hold their offices for the term of one, two, three, four, and five years respectively, and until their successors shall be duly appointed. In case of a vacancy occurring in said board, such vacancy shall be filled by the Governor from names presented to him by the Minnesota State Dental Association. It shall be the duty of the Minnesota State Dental Society to present twice the number of names to the Governor of those to be appointed.

Sec. 3. Said board shall choose one of its members president and one the secretary thereof; and it shall meet at least once in each year, and as much oftener and at such times and places as it may deem necessary. A majority of said board shall at all times constitute a quorum, and the proceedings thereof shall at all reasonable times be open to public inspection.

Sec. 4. Within six months from the time that this act takes effect, it shall be the duty of every person who is at that time engaged in the practice of dentistry in this State to cause his or her name and residence or place of business to be registered with said board of examiners, who shall keep a book for that purpose.

The statement of every such person shall be verified under oath before a notary public or justice of the peace in such manner as may be prescribed by the board of examiners. Every person who shall so register with said board as a practitioner of dentistry may continue to practice the same as such without incurring

any of the liabilities or penalties provided in this act, and shall pay to the board of examiners for such registration a fee of one dollar. It shall be the duty of the board of examiners to forward to the clerk of the court of each county in the State a certified list of the names of all persons residing in his county who have registered in accordance with the provisions of this act, and it shall be the duty of all clerks to register such names in a book to be kept for that purpose.

SEC. 5. Any and all persons who shall so desire may appear before said board, at any of its regular meetings, and be examined with reference to their knowledge and skill in dental surgery; and if the examination of any such person or persons shall prove satisfactory to said board, the board of examiners shall issue to such persons as they shall find to possess the requisite qualifications a certificate to that effect, in accordance with the provisions of this act. Said board shall also indorse as satisfactory diplomas from any reputable dental college, when satisfied with the character of such institution, upon the holder of such diploma furnishing evidence satisfactory to the board of his or her right to the same.

All certificates issued by said board shall be signed by its officers, and such certificate shall be prima facie evidence of the right of the holder to practice dentistry in the State of Minnesota.

SEC. 6. Any person who shall violate any of the provisions of this act shall be deemed guilty of misdemeanor, and upon conviction may be fined not less than fifty dollars or more than two hundred dollars, or be confined six months in the county jail. All fines received under this act shall be paid into the common school fund of the county in which such conviction takes place.

SEC. 7. In order to provide the means for carrying out and maintaining the provisions of this act, the said board of examiners may charge each person applying to or appearing before them for examination for a certificate of qualification a fee of ten dollars, which fee shall in no case be returned; and out of the funds coming into the possession of the board from the fees so charged the members of said board may receive as compensation the sum of five dollars for each day actually engaged in the duties of their office, and all legitimate and necessary expenses incurred in attending the meetings of said board. Said expenses shall be paid from the fees and penalties received by the board under the provisions of this act, and no part of the salary or other expenses of the board shall ever be paid out of the State treasury. All moneys received in excess of said per diem allowance and other expenses above provided for shall be held by the secretary of said board as a special fund for meeting the expenses of said board and carrying out the provisions of this act, he giving such bond as the board shall from time to time direct. And said board shall make an annual report of its proceedings to the Governor by the 15th of December of each year, together with an account of all moneys received and disbursed by them pursuant to this act.

SEC. 8. Any person who shall receive a certificate of qualification from said board shall cause his or her certificate to be registered with the clerk of the court of any county or counties in which such persons may desire to engage in the practice of dentistry, and the clerks of the court of the several counties in this State shall charge for registering such certificate a fee of twenty-five cents for such registration. Any failure, neglect, or refusal on the part of any person holding such certificate to register the same with the clerk of the court, as above directed, for a period of six months, shall work a forfeiture of the certificate, and no certificate when once forfeited shall be restored, except upon the payment to the said board of examiners of the sum of twenty-five dollars as a penalty for such neglect, failure, or refusal.

SEC. 9. Any person who shall knowingly and falsely claim or pretend to have or hold a certificate of license, diploma, or degree granted by any society, or who shall falsely and with intent to deceive the public claim or pretend to be a graduate from any incorporated dental college, not being such graduate, shall be deemed guilty of a misdemeanor and shall be liable to the same penalty as provided in section six of this act.

SEC. 10. This act shall take effect and be in force from and after its passage.

Approved March 3, 1885.

The Governor has appointed the following Board of Examiners: J. I. Clements, D.D.S., president, Faribault; J. H. Martindale, M.D., D.D.S., secretary, Minneapolis; G. V. I. Brown, D.D.S., St. Paul; B. G. Merry, D.D.S., Stillwater; M. R. Metcalf, D.D.S., Duluth. The board will be in session, at Minneapolis, July 31 and August 1 and 3, 1885, for the purpose of issuing licenses to those holding diplomas, and to examine such as may apply, in accordance with the provisions of the law.

DELAWARE DENTAL LAW.

The following is the text of an act in relation to the practice of dentistry in the State of Delaware, passed by the Legislature, at Dover, March 31, 1885:

Be it enacted by the Senate and House of Representatives of the State of Delaware in General Assembly met:

SECTION 1. That it shall be unlawful for any person who is not, at the time of the passage of this act, a recognized practitioner of dentistry in this State, and so recognized by the profession, to practice dentistry, unless he or she shall have obtained a certificate as hereinafter provided, or shall hold a diploma from a reputable dental college, and so recognized by the board of examiners herein created.

SEC. 2. That a board of examiners, to consist of five reputable practicing dentists, is hereby created, whose duty it shall be to carry out the purposes and enforce the provisions of this act; the members of said board shall be appointed by the Governor, who shall select them from the dentists residing in the State. The term for which the members of said board shall hold their offices shall be four years, except that two members of the board, first to be appointed under this act, shall be designated by the Governor to hold their offices for the term of two and three and four years, respectively, unless sooner removed by the Governor, and until their successors shall be duly appointed; in a case of vacancy occurring in such board, such vacancy shall be filled in like manner by the Governor.

SEC. 3. That said board shall choose one of its members president and one secretary thereof; it shall fix the time and place of its meeting or meetings; a majority of said board shall at all times constitute a quorum, and the proceedings thereof shall at all reasonable times be open to public inspection; the board shall also make an annual report of its proceedings to the Governor.

SEC. 4. That within six months from the time this act takes effect it shall be the duty of every person who is at that time engaged in the practice of dentistry in this State to cause his or her name and residence or place of business to be registered with said board of examiners, who shall keep a book for that purpose; the statement of every such person shall be verified under oath before a

notary public or justice of the peace, in such a manner as may be prescribed by the said board of examiners; every person who shall so register with said board as a practitioner of dentistry may continue to practice the same as such, and shall receive a certificate of such registration upon his or her paying the said board one dollar for such certificate.

Sec. 5. That any and all persons who shall desire to commence such practice "after the passage of this act" shall appear before said board at any of its regular meetings, and be examined with reference to their knowledge and skill in dental surgery, and if the examination of any such person or persons shall prove satisfactory to said board, the board of examiners shall issue to such persons as they shall find to possess the requisite qualifications a certificate to that effect, in accordance with the provisions of this act, upon the payment of one dollar for such certificate; all certificates issued by said board shall be signed by its officers, and such certificates and diplomas, granted as aforesaid, shall be *prima facie* evidence of the right of the holder to practice dentistry in the State of Delaware.

Sec. 6. That any person who shall wilfully violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, in any court having criminal jurisdiction, may be fined not less than fifty dollars nor more than three hundred, or be confined not more than six months in the county jail, in the discretion of the court; all fines received under this act shall be paid into the common school fund of the city or county in which such conviction takes place.

Sec. 7. That the board of examiners shall meet within thirty days after appointment, and frame by-laws governing the board, and any person or persons desiring to be examined by the board of examiners for a certificate to practice dentistry in this State shall give notice of such desire to the secretary of said board, who shall notify the members thereof, and they shall, within fifteen (15) days from the receipt of such notice, meet to examine such person or persons, and give him, her, or them proper notice of such meeting.

Sec. 8. That nothing in this act shall be so construed as to interfere with the rights and privileges of physicians and surgeons in the discharge of their professional duties.

Sec. 9. That this act shall take effect from the date of its passage.

Governor Stockley, on the 25th of April, appointed the following to constitute the Board of Examiners: Drs. T. H. Gilpin, Middletown; C. R. Jefferis, Wilmington; C. H. S. Littleton, Milford; E. Lewis, Dover; and C. Porter.

BIBLIOGRAPHICAL.

Modern Therapeutics of the Diseases of Children, with Observations on the Hygiene of Infancy. By Joseph F. Edwards, M.D., fellow of the College of Physicians of Philadelphia, etc. Octavo, pp. 346. Philadelphia: D. G. Brinton, 1885. Price, cloth, $3.00; Sheep, $3.50.

This is an addition to the "Modern Therapeutics" series, which includes a volume each on Medical Therapeutics, Surgical Therapeu-

tics, and Therapeutics of Gynecology and Obstetrics. The purpose of the work is, in keeping with the object of its predecessors, to present as concisely as possible the results of the modern application of therapeutics—in this instance to the diseases of children. No similar volume devoted to this branch of practice has ever before been published. It is not a mere list of formalæ, but, under some eighty headings, the details of treatment, as recommended and practiced by eminent specialists, are given, including remedies and methods proven useful by experience as well as those which recent discovery has introduced with promise of success.

The four volumes alluded to make a respectable library of medical and surgical practice.

Pamphlets Received.

From the Department of the Interior, Bureau of Education, we have received the following circulars: "Planting Trees in School Grounds and the Celebration of Arbor Day." Circular No. 1, 1885: "City School Systems in the United States, by John D. Philbrick, LL.D."—an important document of 207 octavo pages. Washington: Government Printing Office, 1885.

Electricity in Medicine, including a special account of the Galvano-cautery in Nasal Surgery, by Harrison Allen, M.D. Reprinted from the "Journal of the Franklin Institute," April, 1885. Merrihew Print.

Souvenir of the New York Odontological Society. The Annual Dinner, 1885. Pp. 41.

OBITUARY.

J. G. AMBLER, M.D., M.D.S.

Died, suddenly, at Dobbs's Ferry, N. Y., April 6, 1885, of pneumonia, Dr. John Gardner Ambler, in the sixty-ninth year of his age.

Dr. Ambler was born in New Berlin, N. Y., September 2, 1816. He studied dentistry with his uncle, Dr. D. C. Ambler, in New York City, and commenced the practice of dentistry in that city in 1842. He was one of the original members of the Society of Dental Surgeons of the city of New York; a member of the American Dental Association and of the American Dental Convention, of which latter body he was several times elected president. He was a member, vestryman, and warden of Christ Church (Protestant Episcopal), New York.

WILLIAM CLENDENIN, M.D.

DIED, in Cincinnati, Ohio, May 3, 1885, of consumption, Dr. WILLIAM CLENDENIN, in the fifty-sixth year of his age.

Dr. Clendenin was professor of descriptive and surgical anatomy in the Ohio Dental College. At a meeting of the dental profession in Cincinnati, held at the office of Dr. Jonathan Taft, resolutions were adopted expressive of their appreciation of his ability as a scientific teacher; testifying to his noble qualities as a gentlemen, whose courteous manners and character were worthy of emulation; recognizing in his death a loss to the public and the dental and medical professions, and tendering their sympathy to his family.

L. P. MEREDITH, D.D.S.

At the annual meeting of the Kansas State Dental Association, which convened at Topeka, May 5, 1885, resolutions were unanimously adopted expressing regret at the death, since their last meeting, of Dr. L. P. MEREDITH; testifying to his ability as an author, to his merit as a gentleman, and to his high professional attainments. It was ordered that the resolutions be spread upon a memorial page in the records of the association, and that a copy of them be sent to the family of the deceased.

HINTS AND QUERIES.

CANNABIS INDICA AS A LOCAL ANESTHETIC.—Dr. A. Aaronson, of London, Eng., in the November (1884) number of *The British Journal of Dental Science*, brings first to the notice of the dental profession the employment of cannabis indica as a local anesthetic. He says: "The plan adopted by me is to dilute the tincture of cannabis indica some three or five times according to the probable duration of the operation. The diluted tincture is then applied in cotton-wool to cavities, if such exist, and also about the gums of the affected tooth. The beaks of my extracting forceps are also, after being warmed, dipped in the diluted cannabis indica. In cold weather it is wise to dilute the cannabis indica with warm water. I was enabled by this method to remove thirty-one teeth and stumps in one week. In the cases in which I have had to resort to this plan, I have found my patients acknowledge the immunity from pain they enjoyed during the extraction, and all expressed surprise and pleasure at the simplicity of the performance. The ordinary methods of anesthetizing are subject to danger; mine is as effectual, and is devoid of the possibility of harm." Dr. N. J. Hepburn, of New York, in the *Independent Practitioner* for March, 1885, says that the method "has been used in some portions of Europe for a long time with great satisfaction." Why should not this comparatively inexpensive and innocuous drug rival cocaïne as a local anesthetic, and why not employ it directly by means of the hypodermic syringe? It may also prove valuable as an obtunder of sensitive dentine. Attention to the subject has also been suggested by J. Michels, Esq., of New York, late editor of *Science*. Have any members of the profession had experience with it as a local anesthetic?—H.

Fracture of Superior Maxilla—Interdental Splint.—A case of fracture of the superior maxilla was placed in my charge by Dr. Z. G. Armstrong, of Boscobel, Wis. The fracture was caused by the kick of a horse about ten hours previous to my seeing the case. The four superior incisors had been detached and lost, and there was considerable inflammation of all the soft tissues. The line of fracture commenced between the socket of the right lateral and the cuspid, extending back through the palatine bone around the right dens sapientiæ, and forward to the commencing line of fracture. The fractured bone, with all of the teeth on that side, fell downward and forward, the front portion lying on the tongue of the patient; the posterior portion still suspended by the soft tissues. The soft tissues were severed for about one inch back of the incisors. I replaced the bone with the attached teeth in as nearly a normal position as possible, so that when the jaws were closed the teeth articulated. Then, while an assistant held the fractured parts in place, I took an impression in soft wax, in the usual manner, of the injured parts, including the left superior cuspid; then made a model in gutta-percha corresponding with the impression, and placed it in position with soft wax on the lower side, and thus obtained an impression of the teeth of the lower jaw as far around as the left inferior cuspid. The splint with the impression of the lower teeth was reproduced in rubber, which when introduced into the mouth was found to fit nicely and to hold the parts in normal position. A bandage around the head and jaws, to hold the fixture in place, completed the treatment.

The patient was fed with a glass tube, introduced through the splint in the space made by the loss of the incisors. He recovered in a few weeks without perceptible deformity.—F. E. Coomes, Plankinton, Dakota.

In response to Dr. Wegge's suggestion, in the March number of the Dental Cosmos, that the impress of the injection of cocaïne upon the lingual branch of the inferior maxillary nerve is more to be desired than upon the inferior dental nerve, in the conditions under which we usually extract teeth nowadays, I would certainly say yes; for the lingual nerve certainly does supply the alveoli and gums more than does the inferior dental, and the filament of the inferior dental nerve that supplies the pulps of teeth in the lower jaw is usually obliterated or separated from a lifeless pulp in those cases in which we usually extract. My efforts were experimental to ascertain whether I could anesthetize the inferior dental nerve without affecting the lingual, and also to learn if I could, under its influence, have extracted an inferior wisdom tooth which had become offensive to me, but which was still supplied by the filaments of the inferior dental nerve, keeping the pulp alive. In regard to the interrogatory as to whether the puncture of the needle had left any unpleasant symptoms in any of the cases mentioned, I would answer no; nor in several subsequent cases, in which I have similarly used the hypodermic injection.

I would add to this reply that I no longer endeavor to inject cocaïne in the region of the posterior dental foramen for purposes of extraction, having adopted the method of Dr. Walb, of Darmstadt (as explained in the March number of the Dental Cosmos), of injecting two minims of a four per cent. solution of Merck's preparation of cocaïne into the gum on each side of the tooth to be extracted. I usually introduce the needle its whole length, and after evacuating the contents of the syringe, and withdrawing the needle, wait four or five minutes, and then extract the tooth without pain. The only case out of a large number in which I have failed was when the conformation of the jaw and the position of the tooth were such that I could not properly introduce the hypodermic needle.—J. H. Martindale, M.D., D.D.S.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

A METHOD FOR PRODUCING THE KINGSLEY CLEFT-PALATE VELUM.

BY C. S. CASE, D.D.S., M.D., JACKSON, MICH.

THE literature pertaining to cleft-palate and treatment has been admirably summed up in "Oral Deformities," by Dr. Norman W. Kingsley, to whom honor is due for bringing this branch of our practice to its present high state of perfection. The introduction of flexible rubber vela for congenital cleft, and the peculiar shape adapting them to the requirements of the bifurcated uvula and velum palati as a means of best restoring the impaired functions of speech, was, I believe, original with him, and was a decided step in advance, and one that cannot better be described than it is in his work. Where he deals with the mechanical construction of means for producing vela he is, however, so incomplete in specific directions that only dentists of considerable ingenuity and mechanical skill have been able to derive the benefit that the author no doubt intended.

Some time before the issue of "Oral Deformities," in undertaking the construction of my first cleft-palate plate, I was unable to find a practical description of the exact *modus operandi*. I was fortunate, however, in having access to a patient for whom Dr. Grant, of Boston, had constructed a very perfect cleft-palate instrument, with velum made after the Kingsley idea. I was therefore enabled to study its shape, adaptability, and use, but, like many others, was obliged to invent means for its production. The method I then arrived at, after repeated trials, is essentially the same that I have since employed and taught at the University of Michigan.

Believing it to be a system that can be easily followed by any dentist, I desire to describe it in detail, in the hope that I may aid in making this operation more feasible, thereby bringing it within the reach of many sufferers who have been hitherto debarred its advantages.

Dr. Kingsley may use a superior system; he certainly has not given one in his work or elsewhere. After inadequately describing three methods, any one of which it would be difficult to use as a guide, he suggests "that many dentists will prefer to adopt one of the forms of palates already in use rather than go to the trouble of making molds and producing them" for each case. This seems calculated to put the construction of *individual* vela beyond the reach of the general practitioner, and confine him to substitutes that can rarely be obtained with sufficient adaptability to meet all the requirements that make this operation a success.

It is desirable to have artificial vela as perfectly adapted as are artificial dentures of any kind; and while the flexibility of the rubber admits of their being tolerated when imperfect, it is not reasonable to suppose that the rudimentary muscles would use such vela as they would those specially calculated to fulfill their particular functions. I can understand how a dentist who has on hand a large supply of vela of various sizes and shapes may be able to select one that may be approximately adapted, but I believe that the attempt in the majority of cases can only lead to a slip-shod and unscientific performance of an operation that should enlist our earnest endeavors to produce a perfect instrument.

There are other advantages to be derived from individual *metallic* molds, the most important of which is the possibility of regulating the size and flexibility of the velum. It will be shown, moreover, how the first one can be made with the posterior portion or *veil* thin, soft, and abridged, so that it will be more acceptable to the sensitive mucous membrane of beginners; and, by simply scraping away a portion of the metal, subsequent vela can be gradually thickened, extended, and made more inflexible as the parts become accustomed to their use.

In taking the impression, the principal object is to obtain a model of only that portion of the mouth where it is intended that the velum shall closely fit,—i. e., the oral surface that is to be covered by the lateral wings of the velum, and the entire borders of the fissure through the hard palate. Absolute perfection beyond this is not material, although it is an aid to the shaping of the model of the velum, if one can obtain a guide to the thickness, length, and curve of the bifurcated velum-palate, *while in the act of swallowing.*

In addition to the method which Dr. Kingsley describes for taking the impression, I will give one that I employ, and find of great advantage in difficult cases, where it is desirable to duplicate the nasal border of the fissure. Instead of the ordinary impression tray, I use a piece of block tin, about six inches long, and tapering from an inch to half an inch in width, with the edges wired to stiffen it. I

bend this to a slight sigmoid shape, so that while grasping the wide end the narrow one will lay along the fissure; then warm the narrow end of the tin and attach a small portion of No. 3 modeling composition, which has been softened by dry heat so that it will firmly adhere; after this I add a sufficient quantity of No. 1 to fill the fissure, and cover that portion of the oral surface that is to receive the artificial palate; soften the mass in water and introduce; remove immediately and cut away surplus; again soften (the surface), and after introduction instruct the patient to swallow repeatedly. This may be repeated a number of times until the velum palati takes a perfectly natural position in the act of swallowing. No surer course can be pursued to overcome the natural tendency to involuntary contractions of the palatal muscles.

In preparing this composition impression for the final one in plaster, I shape the posterior portion so that it will not touch the velum palati when in position; roughen the surface, so that the plaster will adhere to it, and cut away all that portion which has passed above the nearest approaching borders of the fissure, leaving the cut surface smooth. When this is covered with plaster, and reinserted, that portion which has passed above the fissure will be cut off from the lower, because the upper edges of the composition have been left so that they touch along the borders of the cleft, and therefore, upon removal, this portion of the plaster will readily cleave from the smooth surface of the composition, after which it can be rescued and restored to its position on the impression.

I mix the plaster in warm water, and stir till it takes a beaten-egg condition; then introduce quickly. When the plaster *commences* to harden, instruct the patient to swallow and hold the breath for some time. This will often fix the muscles in one position long enough to obtain a correct impression of the approaching borders of the soft palate and uvula.

The plaster model should be made as small as the required strength will allow for convenience in handling; the nasal and pharyngeal portions of the cleft open, and unsurrounded. All superfluous plaster should be cut away from the posterior ends; the upper surface trimmed on a line with the proposed upper surface of the palate, and the lower one-eighth of an inch below the edges of the lateral wings, for reasons that will be obvious as we proceed. The posteriorly approaching borders of the cleft, which represent the bifurcated edges of the velum palati, must be made parallel, so that the model of the palate can be easily removed and readjusted while it is being fitted to the mouth. (See Fig. 1.)

In speaking of the different parts of the Kingsley palate, which we are about to produce, I shall for convenience designate the thin

lateral portions which cover the oral surface as the *wings*, and that portion which extends back of the velum palati as the *veil* of the palate.

I now fill the fissure of the plaster model with a piece of softened modeling composition, and spread it out on each side over the oral surface to form the wings, and shape the veil posteriorly, according to the size and shape of the pharynx; to be corrected after trial in the mouth. (See Fig. 2.) The work so far has been done with the thumb and fingers, the composition being repeatedly dipped into hot water, while portions more than sufficient to meet the demand have been cut away.

FIG. 1

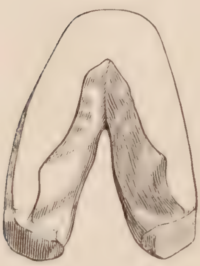
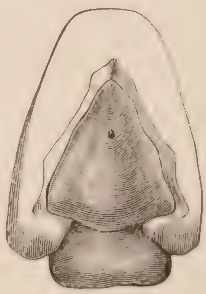
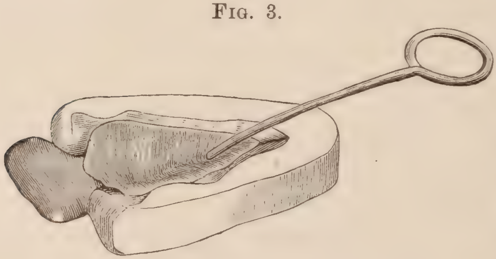


FIG. 2.



I now heat a wire—or a button-hook, if convenient—and thrust it into the anterior portion, and am ready to try the model of the velum in the mouth. (See Fig. 3.) By repeated trials and returns to the plaster model the proper shape is obtained, a description of which is so perfectly given in "Oral Deformities" that it is needless to repeat it here. If I were to suggest any change in the shape of the velum Dr. Kingsley has described, it would be to curve the posterior end of the veil *upward* instead of downward. ("Oral Deformities," p. 297, fourth line.) I have found that a thin veil will retain its shape in this way much longer, the curve acting as an additional spring to the natural elasticity of the rubber in carrying the sides back to place, when the constrictors have relinquished their grasp, after every effort to swallow; while in other particulars it is equally efficient.

FIG. 3.



It is unnecessary to make the model of the veil thin. It will be shown later how the proper thickness is finally obtained. I am particular only in regard to the shape of the *inferior* surface and borders, and their peripheral extent. I prefer modeling composition to gutta-percha because it is sufficiently tough and can be easily shaped, scraped, and polished.

Having the model of the velum prepared and placed upon the plas-

ter model, as in Fig. 2, the object now is to form around it plaster casts that can be duplicated in metal. This I accomplish with the aid of a peculiarly constructed flask, which is made smooth, and beveled from the center, on the inside, so that casts in plaster or metal can be easily removed by lightly tapping the side. (See Figs. 4 and 5.)

I cut down the plaster model (Fig. 1) so that it will pass into the upper part of the flask, this being the side that receives the cover

FIG. 4.

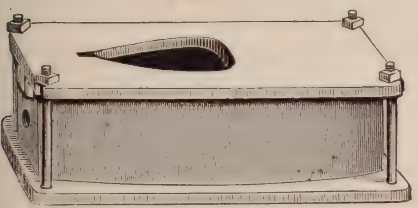


FIG. 5.

and holds it in place by the guide-pieces at the ends (see *a*, Fig. 5); also, the depth of the bevel is greater to admit of the larger bulk necessary to this portion of the model. I fix the model so that the velum will take a central position in the flask, with its oral surface beneath the heart-shaped opening in the cover. I have been in the habit of placing its anterior apex toward the pour-hole (*b*, Fig. 5); but it has been suggested by Dr. Wm. Taft that it be reversed, so

FIG. 6.

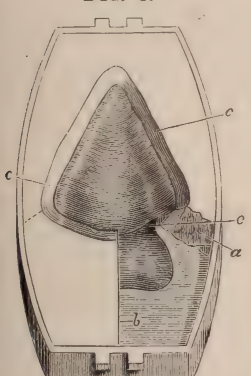


FIG. 7.

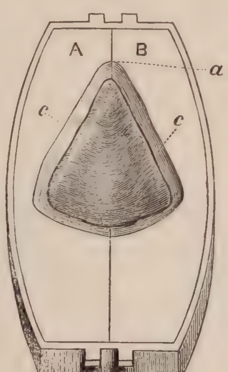
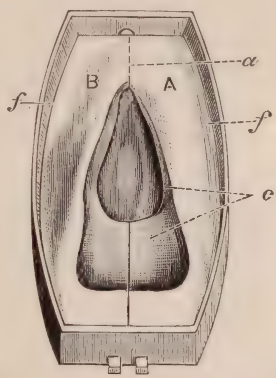


FIG. 8.



that the metal can be poured from the other end of the palate, as air holes will be less liable to injure important parts. The beveled surfaces should be polished and well oiled each time before pouring the plaster. I roughen the posterior ends of the model (see *a*, Fig. 6), and add fresh plaster to one side, extending it along the inferior surface of the veil to its center (*b*). When this is hard, lubricate the surface (*b*), and fill the other side to meet it in the same manner. (See Fig. 7.) By using very thin plaster at first, with a camel's-hair

pencil, the added portions adhere more firmly, and it is easier to fill the spaces (*e*, Fig. 6), which have been cut out on each side, between the wings and the upper part of the veil, for the bifurcated edges of the velum palati. (It may be easier for beginners to put on the posterior extensions of the model before putting it in the flask.) I trim the plaster even with the upper edge of the flask, and on the inside so that its outer edges (*f*, Fig. 8) will stop at the central bend in the beveled surfaces; remove any portion that may have covered the superior surface of the velum, and shape the plaster as is done preparatory to "pouring up" for a set of teeth. For this

Fig. 9.

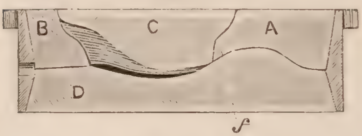


Fig. 10.

purpose it will be more convenient to remove it from the flask. I now remove the *entire model of the veil*, which it will be remembered was left thick and unfinished on its upper surface; finish the remaining nasal surface, and bevel it posteriorly on a line with the plaster that represents the inferior surface of the veil (see *c*, Fig. 8); lubricate the surface, and pour for *D*, Fig. 9. Invert the flask and bevel the plaster from the outer edge of the palate (see *c*, Figs. 6 and 7); cut the posterior portion of the surface so that the plaster, where it meets the velum, will present as strong an angle as possible (see *f*, Fig. 9), and fill for center-piece, *C*. The model of the artificial palate is now completely surrounded with parts in plaster, one of which

Fig. 11.

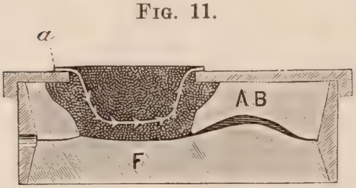
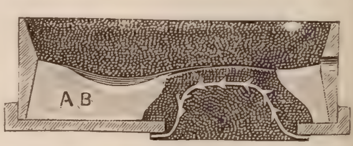


Fig. 12.



contains the original model of the mouth, and when this has been separated with a thin saw, at its anterior end, along the line *a*, Figs. 7 and 8, the palate can be removed.

Before proceeding to duplicate this set of molds in metal, they should first be duplicated in plaster, as they are liable to be broken or injured. The parts *C* and *D* can be removed and new ones poured as before; after which *A* and *B* are adjusted in the flask with the palate removed, and a piece of base-plate wax extended across the fissure opening, so that its oral surface will be on a plane with the nearest approaching border. Fill to form new center-piece (*E*, Fig. 10).

Remove wax, and fill to form *F*. The space originally occupied by the model of the palate is now entirely closed by the molds, *E* and *F*, and *A* and *B*, or any member of the group, can be duplicated, one at a time, by removing it from the flask and filling the space which it occupied. The only caution necessary is to see that the different parts are perfectly readjusted before filling with plaster. For separating purposes I use collodion and then oil.

Again, if *E* and *F* are duplicated in sand, the top and bottom of the flask bolted on, the space occupied by *A* and *B* can be duplicated in metal *in one piece*, by pouring it through the small hole at the end *h*, Fig. 16.

The plaster molds should be scraped so that they will drop from the flask at the lightest tap. Remove *E*, Fig. 10; adjust the cover of the flask, and place a narrow piece of metal (*a*, Fig. 11), with jagged edges, so that its ends will rest on the edges of the

FIG. 13.

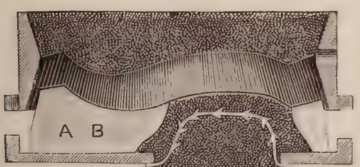
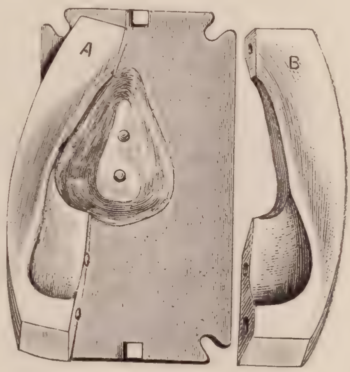


FIG. 14.



opening in the cover and hang into the space below as a nucleus to attach the sand duplicate of *E* to the cover. Fill with sand, as when making a die (see Fig. 11); lift the flask and drop out the plaster mold, *F*, and pack this space also (see Fig. 12); again lift the flask, at the same time tapping it gently, and the cover holding the plaster molds, *A B*, with the sand center will remain upon the boards (see Fig. 13); carefully part them, so as not to injure the sand. (See Fig. 14.) If this cannot be accomplished, on account of the irregularities of the center-piece, the molds, *A B*, can be duplicated in three pieces. (See Fig. 15.)

The cover is now to be readjusted with the sand center attached and the bottom bolted on, the flask set on end at a slight angle, and filled with Babbit's metal. (See Fig. 16.) I prefer Babbit's metal because it melts at a low heat, and produces a sharp mold. Some dentists complain of its oxidizing influence upon the rubber. I have not had this experience. I am aware, however, that there is a great difference in the Babbit's metal of commerce. That which I use is made by More, Jones & Co., St. Louis.

Before pouring it may be necessary to make a number of small holes through the sand for the escape of steam. It not infrequently occurs that the moisture contained in the sand center-piece will be so rapidly converted into steam by the surrounding metal as to cause an imperfection in the cast at the anterior apex of the cleft. This can be avoided by packing into the apex of the sand center a tapering piece of wire, or broken excavator shank, to be removed before pouring, leaving a channel for the accumulated steam. (See *g*, Fig. 16.) Having obtained this cast (see *X*, Fig. 17), it is comparatively easy to produce the other two pieces.

Return *X* to the flask and adjust the plaster mold (*C*, Fig. 9), and pack sand into the space originally occupied by the model of the palate and *D*, being careful not to displace *C* while crowding the sand into the wing spaces. This can be accomplished if a small portion of sand at a time is carried to place with a narrow piece of

FIG. 15.

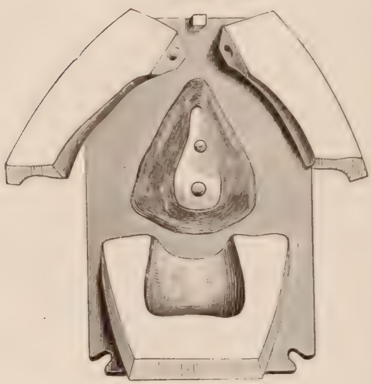
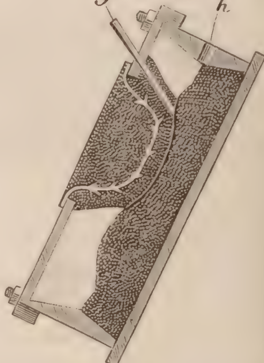


FIG. 16.



blotting-paper. Nor is it material that the sand entirely fill these spaces, as the cast can be cut away to make up for the deficiency. Remove *C*, and paint the exposed surfaces of *X* with a solution of whiting in alcohol; adjust the cover of the flask (see Fig. 18), and pour through the heart-shaped opening, filling it even with the upper surface of the cover.

Finally, to produce a duplicate cast of *D*, Fig. 9, place *X* and *D* in the flask and pack sand into the space originally occupied by the palate and *C*. Remove *D*, and paint the exposed surfaces of *X* with the whiting solution, putting on several coats over the portion that represents the veil. Bolt on the cover and bottom, and pour as at first through the small hole at the end. (See Fig. 19.)

The casts are now ready for finishing. Commencing with the center-piece, scrape away any portion which indicates that the wing spaces were not filled, and burnish the surface which lies next the

oral surface of the palate as you would a filling. In like manner finish the cast, *X*, and see that the surfaces which represent the inferior surface of the velum on both pieces are on a line with each other, and make a perfect joint where they meet in the central portion.

Finish the cast, *D*, so as to produce the proper thickness, length, and width of the veil and nasal borders of the final velum. The work may be tested by warming the casts and producing a velum in wax, paraffine, or modeling composition. The button-hole in the velum, by which it is attached to a plate, can be made by drilling a small hole in either cast, *C* or *D*, and driving into it a steel pin. This should start near the anterior apex of the nasal surface of the velum, and take a direction nearly at right angles with the oral surface.

Before packing with rubber, cover the surfaces with collodion, and then a solution of soap. Warm the casts and pack from the upper

FIG. 17.

FIG. 18.

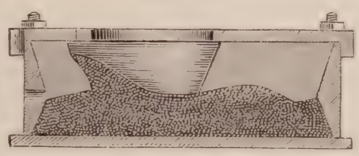
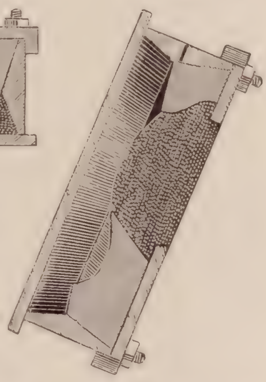


FIG. 19.



side, with *C* and *X* in the flask, and force together by the aid of wet heat and clamp. Moat and gates for surplus rubber may be molded or cut in the casts.

I would suggest that velum rubber be used that contains no mercury and a minimum amount of sulphur, believing it to be tougher, more elastic, and less injurious to the mouth. This can now be obtained at any dental depot.

After vulcanizing, open while warm, and separate the casts by thrusting a narrow screw-driver into the pour-hole. Carefully lift out the cast, *D*, beginning at the anterior end. Should the rubber cling, cleave it from the metal with a spatula, being careful not to use sufficient force to tear the thin veil. Next, remove the center-piece, and force the palate out through the fissure opening in *X*. Trim off the surplus, and you are now ready to take the final impression for the sustaining plate.

For further description, the reader is respectfully referred to Kingsley's "Oral Deformities," which no dentist can afford to be without.

PROCEEDINGS OF DENTAL SOCIETIES.

SOUTHERN DENTAL ASSOCIATION.—SEVENTEENTH ANNUAL SESSION.

Second Day—*Afternoon Session* (continued).

Continued from page 362.

The Committee on Pathology and Therapeutics was called, and the paper read by the president, on "Pyorrhea Alveolaris," * was declared open for discussion.

Dr. Walker was inclined to take issue with the essayist and with Dr. Riggs also. Both place their dependence in the treatment of this disease on surgical operation alone. The speaker has found great assistance in various remedies in the management of these cases.

Dr. Reese. The most important thing to find out in regard to a disease is its cause. There are several things which observation seems to say will cause pyorrhea; but this is rather a symptom than a disease *sui generis*. A syphilitic taint will cause it, or the mercurial taint will give rise to this symptom under proper conditions for its development. The speaker believed it was also caused by long-continued use of alcohol, either by the patient himself or by his immediate ancestors. It has been decided that the use of alcohol, even in small quantities, increases the quantity of uric acid in the system. Uric acid has a strong affinity for sodium and its salts, and it is through this that alcohol acts in the causation of pyorrhea. Sometimes the disease goes on and destroys the pericementum without any deposit being noticed; the destructive action always precedes the formation of the deposit. He has had the deposit found in the disease under discussion analyzed. One chemist gave it as his opinion that it was composed almost wholly of uric acid, which is one of the constituents of gout. Another feature about pyorrhea alveolaris is that, like gout, it is almost wholly confined to men. He had never observed it in women until after they had passed the climacteric. This might be because the menstrual flow helped to eliminate the uric acid from the system in women. Dr. Pfeiffer names the following medicaments as having a tendency to decrease the amount of uric acid in the system,—atropine, digitalis, acetate of potassium, and quinia; while bicarbonate of potash increases it. In his observation, those of sedentary habits are more liable to this disease than others. He had never seen it in the negroes, nor had he observed gout among them.

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* See Dental Cosmos for May, 1885, page 265.

Dr. Morgan. It is a general axiom that if you remove the cause of disease in a moderately healthy system the disease will cease. If you remove the teeth of a person suffering from pyorrhea the disease will stop. He does not know the cause, but according to his observation the negro is afflicted with pyorrhea as often as the white man, and females as often as males. He knew one family in which all the females had it before they were ten years of age. Last summer he saw in his son's office a mother and her daughter, both of whom had pyorrhea. For three generations back there has been no abuse of alcohol in this family. In one direction the investigations of Dr. Reese upon this subject are very commendable,—that is, in his efforts to find out just what the deposit is which is found in most of these cases. The probabilities are that, if we can find out just what this is, we shall readily discover the means to combat it. Lives are being shortened by this disease, and by the deferring of treatment. He has had cases where as a last resort he removed the teeth, and in six months' time he was amazed at the change for the better in the health of the patients. He holds that we must have local treatment in ordinary cases, and combined with this systemic medication in the more aggravated types.

Dr. Taft. There is quite a variety of symptoms and quite a difference of opinion as to what is a symptom of the disease under discussion, but we are not told what are its causes. If we should investigate the subject carefully, we should probably find that there are times when the system yields readily to any influence,—as, for instance, when it is enfeebled. Another condition which we would probably find exercising its due influence in the production of disease is the lack of good elimination, allowing effete matters to remain in the system to clog its efforts. Where this is the case the gums afford a very convenient place to set up manifestations of irritation, especially if the teeth are not actively used. Then, again, when there are any forms of foreign bodies on the teeth which are allowed to remain there you can readily see how disease would be taken on. If we have a case in which the tissues are imperfectly nourished, and there is a want of free elimination, and with these absorption of pus, there is an aggregation of conditions which makes a very unfavorable outlook for the patient, and until these are removed local treatment alone will not avail. Local treatment is necessary in the treatment of pyorrhea alveolaris to remove all the foreign matters, but it will not do all that requires to be done. The system must be repaired and toned up. When that is done, if there is sufficient strength in the system, it will be able to complete the restoration to health ; but without this you cannot get up to that level. He thought it much more important that we should appreciate these

principles of treatment than the application of any one remedy. We find no universal panacea for this disease; the systemic condition must be taken into consideration. With a proper understanding of the principles which underlie all treatment we will be able to select the remedy and the method best for any given case.

Dr. J. A. Robinson, Jackson, Mich., is certain that in cases which have been successfully treated by his method the disease has not been brought about by the use of alcoholic liquors. Two years ago a lady came to him with every tooth in her head loose, but she had never lost one of them. Four months previous to the time she came to him, she had been broken down by a domestic affliction. The gums were treated with the carbolized potash preparation known as the "Robinson remedy." It is composed of equal parts carbolic acid in crystals and caustic potash in crystals, brayed together in a mortar and made into a creamy paste with a very little water. It is applied to not more than five teeth at a time on a rope composed of cotton fibers twisted into a fine yarn. In using it a portion of the yarn of sufficient length to go around a tooth is dipped into the bottle containing the medicament, and is laid on a napkin to absorb the surplus, as too strong an application might produce sloughing, and is then applied, as far up the gum as it can be placed, with a tool having an edge like a graver. If the preparation grows stiff it should be heated until it becomes liquid. The fibers of the cotton used to make the yarn should be very small, about like floss-silk. After being applied the medicament is allowed to stay about a minute, as a rule, or until the next tooth is treated, when it is to be removed. If there is any pus the cotton will be black; the less pus there is the less will be the discoloration. In a short time after treatment as above he examined the mouth of the patient and pronounced all the teeth well. The cure is usually effected by one treatment, a second application being very rarely necessary Another case he recalled was that of a man, aged fifty-two years, who had suffered severely from pyorrhea, having been treated with all the various remedies recommended, without success, as the disease would come back in three or four months. Two of the teeth were so loose that he took them out with his fingers; the rest he lashed up with wire, and treated pretty heroically, four or five at a time, with the carbolized potash. The remedy was applied on a Saturday, and the patient, who resided in the country, was directed to report on the following Saturday, but he failed to come for several weeks. When he did come, at the end of the fifth week, the mouth was entirely well. Dr. Robinson could not say that the disease would not recur, but for the present the case was all right. He also detailed other cases showing the remarkable effects following the treatment he advocated, and warmly recom-

mended a trial of the method, as he felt sure such a change would be produced in twenty-four hours that one would hardly believe they were the same teeth that had been treated.

Dr. Walker had had very good results, after a thorough surgical operation, by treating with carbolic acid, 1 part; tincture of iodine, 1 part; glycerin, 10 parts. Mix well, and add 6 parts Labarraque's solution of chlorinated soda. This preparation, he said, was excellent for any suppurating surface. It is applied to the gums with an ordinary tooth-pick, with the thin end shaped into the form of a spatula; a drop of the solution being passed down to the point where it is required.

Dr. Fountain showed a specimen of fusion, three lower teeth being involved.

The committee appointed to prepare a memorial of the late Dr. S. M. Prothro, reported a series of appropriate resolutions, which were adopted by a rising vote, after remarks by Dr. Morgan.

Adjourned.

Evening Session.

Dr. Harlan had thought while listening to Dr. Rawls's paper that the number of sailors who fall into the hands of dentists in the interior cities of the United States must be very small, and as they are popularly believed to constitute a goodly portion of those who indulge in a diet which consists largely of salt meat, it had struck him that the ingestion of chloride of sodium could scarcely be accounted a very important factor in the production of pyorrhea alveolaris; especially as the users of such diet readily recover from the effects of the deprivation of vegetables when they return to a diet of which vegetables form a part. As to the statement that many railroad laborers suffer from diseases of the gums, which are attributed to their having subsisted largely on salt meats, the speaker's observation is that this class is utterly destitute of any kind of attempt at securing cleanliness of the mouth. We oftener find impactions of calculus as the result of improper diet than pyorrhea. The impossibility of transmitting a local disease bears its condemnation on its face. Hence it would seem that users of salt meats do not acquire much pyorrhea by heredity. Those dwelling in malarial regions may observe ptyalism after mercurial treatment, but the ptyalism that is seen after the exhibition of mercury has ceased is not true pyorrhea at all. That a mercurial impression, in reference to the forms of the teeth, may be transmitted there is no question, but that pyorrhea alveolaris is handed down he must deny. He coincided with the opinion that surgical treatment is of the highest importance, but he could not agree with the idea that effective germ-

icides do not exert a beneficial influence when properly applied. The paper states that in pyorrhea the bony septum seems to melt away, but leaves the gum on or nearly on the original line. This does not obtain in the speaker's region. It must not be supposed for an instant that salivary calculus has anything to do with the incipiency of pyorrhea alveolaris. Deposits of salivary calculus may be considered as a disease that merely displaces the gum mechanically. These are continuous, but the deposits of serumal or sanguinary calculus are not continuous, being found in little islands. It is certain that the alveolar process disappears, and the pockets are observed more frequently on the labial surface than between the teeth. When seen on the mesial or distal surface it is usually where the adjoining tooth has been extracted. It need scarcely be said that the thorough removal of the deposits is absolutely indispensable, and that the diseased edges of the bone must be broken down and scraped out and removed and the pockets scrupulously cleansed out. In some cases it will be found better to make a transverse slit to remove the débris; a longitudinal cut must be stitched to prevent puckering at the gingival margin. In the majority of cases he uses peroxide of hydrogen to displace particles of deposit. If we exclude the saliva and use the peroxide in the strength in which it comes to us, we will remove many particles which cannot be dislodged with instruments. A blood-clot in such situations is not transformed into tissue, though Dr. Black says that it furnishes a protection. In the opinion of the speaker those cases which get well under the surgical operation alone are not pyorrhea alveolaris, but salivary deposits with aggravated inflammation of the gums. In true pyorrhea there is need for something that will destroy the bacteria. The certainty of the infectiousness of true pyorrhea alveolaris he has demonstrated in the mouth. He purposely introduced pus from pyorrhea to the gum and total loss of the tooth infected followed. Our instruments should be cleansed after treating pyorrhea in some antiseptic solution that will destroy the spores of the bacteria, such as a solution of bichloride of mercury, a ten per cent. solution of resorcin, and others. Stiff brushes should not be used. All loose teeth should be ligated with a band sufficiently firm to maintain them in their proper position, and above all the pockets should not be over-treated. It is not necessary to inject the pockets every three or four days for a long period. We should allow intervals to permit nature to do something toward recovery, because we do not cure with the remedy which we employ, but allow nature to work the restoration to health.

Dr. Jas. S. Knapp, New Orleans. It would seem that if this disease were caused alone by tartar we should find it in all cases where we find tartar. This is not the case, but there is ground for think-

ing that tartar does cause the recession of the gums from around the teeth, and for this reason there should always be a thorough removal of all such deposits when observed. His practice, after removing the deposits, is to apply chloride of zinc—the soft—with just enough water to dissolve it. A piece of wood, sharpened to a point, will hold enough for one or two teeth. The chloride is retained not more than two or three minutes, when the pockets are rinsed out with water, and tincture of iodine applied. This need not be rinsed away. It produces discoloration, but no pain. If this treatment is followed up there will be considerable improvement in three or four days, the gums being hardened. He could not say that it would make the edges of the alveoli grow again,—that is not so easy to do,—but there may be something of reproduction. The patient should be directed to keep the mouth clean.

Dr. Rawls finds that his meaning is still misconstrued. He has contended that when the process is broken down by pyorrhea it is hardly possible to effect a cure; that under proper treatment the disease may be checked and its ravages stopped for a time, but the susceptibility to a recurrence is still there. Whether he is right as to the cause or not, he has never had a patient suffering from pyorrhea who was not under the heredity of mercury or a great salt-eater. He has also observed that patients under treatment for miasmatic diseases require more salt than the average. It is certainly true that twenty years ago laborers and sailors did subsist largely on a salt-meat diet. He had investigated many cases to satisfy himself that mercury or salt was the cause of the trouble. It is possible that he is wrong; that the excessive use of salt or mercurial heredity is merely concomitant to the condition, but the relation has been so constant under his observation as to lead him to the conclusion that it was in the nature of a cause. It has been said that reproduction of the gum can be made to take place; that proper treatment is to inject the pockets with medicaments and allow the tissues to build themselves up. It might just as well be said that tissue can be made to grow over dead bone. The suggestion is contrary to every law of physiology, and reminds him of the idea that perfect restoration is possible at the end of a tooth which has been denuded of its periosteal covering. The paper which he read was intended to place his views of this subject properly before the profession. He contends that the use of mercury will produce the state of the system which renders possible the condition, so difficult to cure, which he recognizes as pyorrhea. He is aware that he is treading on dangerous ground when he contends that pyorrhea is not caused by bacteria, and that therefore antiseptics are of no use in treating it. He believes that bacteria follow in the wake of the disease; that they are

not its cause, but a result of it. What is wanted in order to cure, if it can be accomplished, is a reorganization of the tissues, though this cannot be obtained by removing the bacteria alone; but when you have removed everything that will be deleterious you will have done all that is in your power in the way of local treatment. A simple operation for this purpose and protection for the parts is about all you can do in these cases.

In reply to a question, Dr. Rawls said he considered the mercurial impression just as much transmissible by heredity as anything else. Every molecule in the organization is marked by the circumstances which surround it, and when so marked its characteristics are as readily transmitted as the color of the hair or eyes. We know that the tissues of mercurialized persons do not have the integrity of those who are sound, and that they are therefore more susceptible to disease, and it is these characteristics which are transmitted. The impression is not necessarily permanent; on the contrary, it is being eliminated all the time; but while it exists its character may be transmitted.

Dr. Taft was willing to concede that there is hereditary transmission of those things which inhere in the constitution; but this impression is temporary and passes away, its duration varying according to the power of the system to rally; and he doubted if a tendency so temporary can be so transmitted. Syphilis is never eradicated, and it is transmitted, but he questions if the mercurial taint was handed down, though parents suffering from it might not be able to produce a child as strong and robust as when their tissues were in their integrity.

Dr. Geo. H. Cushing, Chicago, would ask Dr. Rawls what were the physical signs of transmitted mercurial taint.

Dr. Rawls considered the condition under discussion one of the best evidences of mercurial taint. He could not say just what marks the tissues bear, but they seem to be weaker than normal tissues. It may not appear in the first generation, but may be seen in the future. His idea is that it is not so much the accidental condition which is transmitted as the impression caused by that condition.

Dr. J. L. Fountain, Bryan, Texas, lives in a malarial district, and pyorrhea is very prevalent. It may be caused by malaria or by mercury. As a rule, the first thing which patients who apply for relief say is that they had malarial trouble, and the doctor prescribed mercury.

Dr. J. A. Robinson, Jackson, Mich., read a paper entitled "How to Increase your Business," of which the following is an abstract:

To make yourself felt in the world you must do the things that others do not do, and this requires study and effort. One of the great helps is to read all the dental journals thoroughly, and attend

all the meetings. There is a large field of labor that has never been cultivated by the average dentist. The treatment of diseased teeth and gums is scarcely understood or practiced. Artificial crowns are rarely attempted, except in large cities. Correcting irregularities and treating diseased gums are important parts of our vocation that have been almost entirely overlooked by the average practitioner, and it is one of the most satisfactory and delightful branches of the profession. It cultivates high art, and develops the dentist as well as the community. It broadens the profession, and brings relief to the mind that is fatigued with the daily toil of the operating chair. The subject of regulating teeth is far more practical and useful than a great share of the embryonic studies upon which so much time is spent by the dental student, and its practice will assist him in gaining a foothold. The fraternal feeling among the profession in cities is one of the most dignified means to increase professional patronage. Let the people see that we have confidence in each other, and they will confide in us. Not the least requisite to success is to have the courage of your convictions, and personal force enough to impress your patrons with the principles and truths you wish to teach. Our success in the future will depend on our ability to make our work permanent. Our duty is only half performed unless we insist at all times on thorough cleanliness of the mouth. The last but not the least thing to increase your business is modest advertising, either by card or newspaper. The world at large must be instructed in regard to the value of their teeth.

Adjourned.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a regular monthly meeting at the house of Dr. J. W. Clowes, No. 667 Fifth avenue, Tuesday evening, April 21, 1885.

The president, Dr. William Jarvie, in the chair.

J. W. Clowes, D.D.S., read an essay, from which the following is an extract, on

Separation of Teeth.

In the *Independent Practitioner* for April appears my " office talk " on the wisdom tooth. As in that case the subject came directly from a sitter in my chair, so now I get my text from the same quarter for this evening.

" Oh, doctor, what a great thing you did for me thirty-five years

ago when you *separated my teeth.* Had you not done so then, I verily believe there would be no teeth in my mouth to-day."

That was my patient's declaration, and this is my reply: I can hardly tell how happy I am at this expression of your approval; for while I performed that work you were shaking in your shoes from fear, and saying in your mind, "*If he should ruin my teeth, what would I do!*" And now, after all those years, to have the testimony that has come through your experience, I may well feel proud that my practice of that early time was founded on the right. Before you, your parents had been patients of mine, and although their needs were principally artificial, your mother still retains every tooth and vestige of a tooth that I found in her mouth on our first acquaintance. After your marriage your husband's teeth came under my care, and for more than a quarter of a century his faith in the work of my hands has been as unswerving as those military lines he has so often led where patriotism and duty called. During those years a little band has sprung up in your own household, which, when from time to time they have come to my office, we have facetiously called the "junior regiment for inspection." Under your command these family troops have trained well, and *there is nothing more beautiful in the province of dentistry than the results which have come to pass in their mouths by dental culture.* Their dentures are full without forcing; their contacts light and positions erect. Approximal cavities have no place there. The wisdom teeth are good in shape and substance, and *heredity itself has been overcome.* What should we think of a physician who could set aside inherited tendencies to disease? What we may not even *think* of in medicine we may *declare* of dental science,—and thank God! An emphatic expression was once given at a society meeting by one of my professional brethren in these remarkable words:

"Mr. President, I wish to denounce this practice of separating teeth,—this cutting away of their dentine and enamel,—this wanton waste of their substance and strength. Having heard so much said upon this subject, I was induced to separate several of my patients' teeth; but after a little while every one of them came back and begged me to restore what I had taken away, for I had made them miserable by reason of the annoyances to which they had been subjected. I have had some separating done to my own teeth, with the same result as to my patients', and never was more happy in my life than when their natural contours were restored by building them up with gold."

What separation could do for him—what it had done for them—was thus graphically shown. It left no room for doubt that the practice was bad. As this denunciation had come from the prac-

tical tests and experiences of one high in authority, the juniors of the profession readily fell into line and declared their readiness to "let the Almighty's work alone." They did not propose to lend a hand at anything like innovation. Perfection in the shape and position of the teeth had been reached, and they were content. *Under this reasoning the vine would go unpruned, and helpless infancy find no protection in the world!* I should have stood alone, on that memorable occasion, had not one venerable friend, stirred by compassion for my forlorn condition, given me aid and comfort. "I have," said he, "been told that the South Sea Islanders file their teeth to shapes resembling those of a saw, and as yet no evidence has been given of damage from that cause." With only this feeble plea to cheer me on, I ventured in my extremity to ask information on a single point. By inference from what has been said regarding the hurtfulness of separating teeth, it might well be credited that a continuous procession of complainants, in woeful plight, must be coming to my office and demanding relief. *The first man, woman, or child has thus far failed to make such a demand or to enter a complaint.* What are we to think of this, and how shall it be explained? A gentleman answers (*sotto voce*), "Your patients think so much of you that they do not want to let you know." This pleased me well, and scored a victory for the right. My patients are ready enough to report the slightest twinge of pain, and if from any cause they hesitate awhile, my admonition, "in no wise to suffer but come back at once for relief," cannot escape their memories.

J. Smith Dodge, Jr., M.D., D.D.S., then read the following paper entitled

The Nerve-Centers and the Teeth.

The recent studies of the etiology of dental decay, while they are far from completion, have made one thing clear and indisputable. We are not to expect that any one cause will ever account for all the phenomena. To be sure, gentlemen who become absorbed in the researches of the laboratory come to feel that their special line of research will ultimately reveal all that is worth knowing about the matter; but those who are uncommitted to any hypothesis, and who test them all by the facts of daily practice, soon find that the theory which perfectly fits one case or one group of cases is quite insufficient for the next day's observations.

The environment of the teeth is very complex. From without they are attacked by air, food, and buccal secretions; by mechanical violence, chemical solvents, and destructive microbes; while within they depend on the whole range of systemic agencies, fetal and adult,

nervous and vascular, permanent and transient. Obviously a serious failure or perversion of any of these influences will put the teeth at a disadvantage, and on the one side increase the energy of the attack, or on the other lessen their means of defense. The present paper proposes to take up one aspect (a most important one) of this complicated subject; and all that precedes has been written as an emphatic disclaimer of any attempt to account for all the phenomena or all the causes of dental decay. The cause to be considered is not immediate, but predisposing. It might be said to be not so much a cause of decay in teeth as a cause of their non-resistance to decay. And yet the subject is not presented as one of little but as of very great importance; for, after all, the active causes of decay surround all teeth, and they only endure which are able to resist.

The pathology of to-day may be said essentially to differ from that of thirty years ago in two points,—the identification in so many cases of the mysterious *materies morbi* with parasitic organisms, and the growing recognition of remote local effects produced by the transmission of nervous impressions. The latter is illustrated abundantly in therapeutics, as by the treatment of skin diseases with quinine, the cure of headache by preventing the formation of hydrogen sulphide in the small intestines, the regeneration of a woman's mind and body by sewing up a rent in the cervix, and it is rapidly becoming a prime factor in all diagnosis. Now, both of these lines of investigation greatly concern the teeth. The connection of microbes with dental decay is at present boldly in the foreground of investigation, and is here referred to in passing only that the writer may not be supposed to discredit or undervalue what has been established on that side. But there are teeth at which bacteria gnaw in vain; and our present theme has to do with the question why all teeth are not so invulnerable. I believe the answer will be found in the relations of the teeth to the nervous system.

The nervous supply of the teeth is very large, embracing the root through pulp and periosteum in a copious and elaborate network, and their connection with the nervous centers is immediate and important. Supplied so freely by the fifth pair, the teeth are by it most intimately connected with the pneumogastric and the sympathetic chain, and thus with the nerve-centers governing every vital organ. It is well known how variously disease of dental pulp or periosteum can play on these thousand strings, and what perplexing trouble it can cause in organs the most remote. But it is not so well understood that the current may flow the other way, and trouble of the teeth which to the sense seems wholly local may be only the local report of a distant disturbance. I do not specially mean those sympathetic toothaches which occasionally occur without fault of the

tooth, but I wish to express the opinion that the integrity of the teeth depends largely on the trophic function of its nerves, and that this function is readily disordered by abnormal impulses, or the failure of normal impulses, from the nerve-centers; of which the result is incapacity in the tooth to resist the destructive agencies that surround it. Let us consider this trophic function.

If you incautiously cut into the pulp of an adult's tooth, the response will be instantaneous and forcible; and yet that nervous trunk has been there thirty years, perhaps, and never till this moment had occasion to report an injury. What has the nerve been doing those thirty years? Something, or it would not be so ready now. An eye kept thirty years in darkness would not respond so perfectly to the first beam of light. A muscle unmoved for thirty years would be incapable of motion. There must be, then, some function proper to this nerve which it has all this time performed, and that function is to keep the tooth alive.

When nature undertakes to garnish the highly organized and vascular jaw with a row of mill-stones, and to hold such dissimilar parts in harmony, she takes up a difficult task, in which the one condition is to keep the teeth alive. For this are all the multitude of nerve filaments which within and without surround the dentine of the root, and pour, we cannot doubt, a constant stream of vitality through the dentinal fibrils, and, if you will, through the reticulum of Heitzmann. This is the controlling force which presides over the development of dentine; which sustains its living condition and gradually increases its density; which fights within it against the encroachment of decay, forming a limiting zone to retard its progress, and which, exhausted and withdrawn, sometimes leaves the tooth in old age a prey to the most rapid destruction. Now, it is the especial purpose of this paper to emphasize my fixed conviction that the ravages of decay in the teeth of children (and the same is true of many adults) are due to defective structure of those teeth, and that this defect of structure results from greater or less failure of the nerve-centers to perform upon the teeth, growing or grown, their trophic function.

Nor is this a longer way of saying what has been so often said before, that unhealthy mothers bring forth unhealthy babes who grow poor teeth. I am trying to put a finger more precisely on the seat of trouble, which has been hitherto but vaguely guessed at. For instance, the opinion widely prevails that rapidly decaying teeth are such because they have not lime-salts enough. Is that true? I do not remember any researches which prove that these poor teeth have any less earthy matter than those which last seventy years. They are soft, indeed, when cut, but that proves nothing. We call

them "chalky," and the name is good. Is chalk, then, wanting in lime-salts? It may be that they lack lime, but I believe it a venerable and unfounded assumption. Still, letting the old assumption stand, *why* have they not lime-salts enough? Enough has been found to make forty pounds or more of bony skeleton; why not a few grains for the teeth? Is it not more reasonable to talk of a defect of combination than of supply? And who has not seen under the microscope how faulty the structure of these teeth is? Whether, therefore, the proportion of lime be normal or abnormal, the true failure of such dentine does not so much concern the quantity as the adjustment of materials. The fact is, we talk too much of the earthy and the animal parts of dentine, as if they were two things. Dentine consists of *all* the elements given in the chemist's analysis. Take away a part, and you have no longer dentine. When the dentine is sound and perfect, the phosphate of lime is just as much alive as the albuminoid portion, and we should think and talk, not of the parts into which it may be separated by destroying it, but of *dentine*. By all this I mean to urge the consideration that it is not the excess or lack of this or that constituent which makes the trouble, but that the tissue is badly put together. As Mr. Durham writes of a similar condition in bones: "In healthy bone the constituents are combined; in diseased bone they seem rather to be mixed." Just as epithelium or brain, while chemically much the same, may be of high quality or low, so dentine, formed under healthy innervation, will be one thing, while with trouble at the nerve-centers it will be functionally quite different, though neither test-tube nor microscope can fully account for the difference. And here, lest I seem to present a merely personal and unsupported fancy, let me refer to authorities upon analogous diseases of bone.

There are two diseases of the general bony system which more or less resemble the dental condition before us,—rickets in infancy, and the rare disease of adult life, osteomalacia. Of osteomalacia Mr. Durham writes, as quoted in Bryant's Surgery, "It is to be regarded as a particular expression, as it were, of a general morbid condition of the system, rather than as a special disease of the bones themselves." And Bryant adds, "Its cause is wrapped in obscurity. It chiefly attacks subjects who from some cause or other have been subjected to prolonged depressing influences, more particularly upon the nervous system." Of rickets Dr. Bartholow writes, "Certain bodily states of the parents may exert a very baleful influence on the constitutions of their offspring, of which rickets may be regarded as an example. An innate tendency to rickets is a result of marriages of consanguinity, or of those too old, or of the feeble and cachectic. * * * All the causes of every kind which depress the bodily powers of

the mother increase the tendency to the production of rickety children." And a final quotation from Dr. Fothergill's admirable work on "Indigestion and Biliousness" may bring us back to our theme. This high authority says, "There is much pointing in the direction that the pace at which we live nowadays is exercising a persisting effect upon the digestive organs of a deteriorating character. The dental caries so prevalent, indeed universal, at the present day is but a part of the general, widespread failure of the digestive organs. * * * Whence comes the profound modification of the organic processes, the commissariat of the active or animal part of the body? It is the effect of modern life upon the nervous system."

It is evident from these quotations that analogous conditions of the bones are coming to be regarded by the best authorities as expressions of general nervous depression, and that the same authorities incline to the opinion which I am urging, that the teeth are similarly influenced.

But this opinion by no means rests wholly on analogy. The dentist need not look beyond his own field to find ample proof. As regards the influence of maternal conditions during gestation on the tooth-germs of the fetus, the evidence is beyond doubt. The journals have for years contained reports of cases, from time to time, in which successive children of the same mother showed different qualities of teeth which corresponded with differences of maternal regimen. Most commonly the difference is spoken of as a varying supply of lime; the use of unbolted flour, the administration of lime-salts, removal to a lime-stone region, have been variously given as causes of improved dental development. But these are likely also to be causes of improved general health, and so of increased neural energy; and this view is confirmed by other testimonies which give the same results from other methods of general improvement. The members of the Odontological Society will remember Dr. Rich's account of the benefit exhibited in the teeth of children from gymnastic training of their mothers. So that it looks to me plain that we are not to regard this matter as one of more or less material for tooth-building, but as concerning the ability of enamel-organs and odontoblasts to work up the material at hand into perfect tissue.

But the influence of maternal organism becomes less immediate at birth, long before the permanent teeth have completed their structure; and at this period we must look to the nerve-centers of the child. Now, I can hardly conceive that any observing dentist doubts the influence of infantile sickness or health on the character of the permanent teeth. The various forms of atrophied enamel are now, as they have long been, considered the results of general

disease during their formation; and the different quality of dentine and enamel, without defect of form, which so often distinguishes teeth of simultaneous development from those formed earlier or later in the same mouth, can frequently be directly traced to grave fluctuations of general health. Indeed, I am convinced that the inferiority of the first permanent molars is largely due to the general disturbances which so commonly accompany the first dentition.

A step further brings us to consider the teeth that belong to the so-called nervous temperament. When this phrase means, as it did in the old physiology, a harmonious organism thoroughly ruled by a well-balanced nervous system, we find admirable teeth,—small, a little spaced, of a dark but translucent yellow, and very enduring. But when the phrase means, as it does in popular use, a fragile organism, overridden and devoured by hypertrophied nerve-centers, we find, together with the vivacious spirit, the brilliant eye, the transparent skin, and the weak lungs, pearly teeth, which you can almost see through, beautiful while they last, but easy to cut and doomed to decay.

Thus far we have been concerned with the original formation of the teeth. But turning now to their subsequent history, we shall find numerous illustrations of our theme. We have all groaned in spirit over the teeth of children hard driven in study and pleasure. The original sensibility rises to the point of a positive neurosis, and month by month they melt like snow. We all know the destructive results to the mother's teeth of pregnancy and of the long depression of vital energy which so often follows it. Something has evidently enfeebled the teeth. In New York the fashionable world dissipates all winter, and aims to recuperate in summer. I have found it a common thing that the same woman's teeth, which were fairly normal in the fall, become sensitive and decaying by spring; and I have often found the condition reversed again after a summer reasonably spent. Finally, in old age teeth which have withstood the work of a life-time frequently succumb to rapid, diffuse, painless decay, which forces on you the conviction that somehow life has half deserted these outworks and abandoned them to the enemy.

Now, all these instances bear upon the same point,—namely, that whatever at any period of life exhausts or prevents the action of the great nerve-centers impairs the power of the teeth to resist the ever-present causes of decay. More might be added, but it is needless. I, for one, am convinced that the nerve-centers hold sovereign sway over the formation of the tooth and the nutrition of its tissues; so that without due and constant influence from those centers, the formative elements are unable to perfect their work, and if this sus-

taining power be impaired or withdrawn the teeth become an easy prey to the manifold agencies of ruin which surround them.

If these views be correct, we are confronting, in the ruinous decay of teeth, only one angle of a many-sided subject; and indeed we can hardly stop short of philosophizing on the entire structure of modern society. Formerly man ruled the world by muscle and bone. The strong arm, the brawny back, the impetuosity of animal vigor, made the ruling men and the ruling races. Now man rules the world by his nervous system. Clearness of understanding, tenacity of purpose, energy of will, make now the kings of men. It comes to pass, therefore, that those races rule which can put forth most forcibly and sustain longest the powers of the nerve-centers. Each man, each race, rivals the others, until we begin in our time to see a one-sided development of the best races, which is the exact reverse of what prevailed a thousand years ago, when the leaders of the world were brutal giants, ruling by bone and muscle, with intellect and sentiment shockingly atrophied. To-day the other end is up. It is brain and will that rule, dwelling perhaps in a hundred and twenty pounds of aguish flesh, tormented with dyspepsia and insomnia. That this modern man has bad teeth, and his children worse, is only a part of the same physical atrophy, the price he pays for hypertrophied nerve-centers.

I have spoken of the *man* of to-day, but the same thing is true of our women. Having come within the last few generations into the sovereignty of the social world, how infinitely more delightful they make it by their charms of mind and sentiment than their predecessors ever did by mere force of physical charm. That is to say, they exactly parallel the man. They have replaced the former reign of beautiful flesh by a nobler reign of delicate and exalted nerve-centers, which, as before, cultivation and rivalry push to the last extreme.

Now, when this man and this woman combine their energies for the initiation of a new life, it may easily be foreseen that their nervous systems, racked and exhausted by these perpetual struggles, will have too little latent energy remaining to endow their offspring. You cannot eat your cake and have your cake. Neither can you spend your neural force in the service of individual life and at the same time respond normally to the large demands of reproduction. It is an old observation that all unusual expenditures of brain-force tend to produce sterility. For the same reason they lower the quality of the children whose conception they do not prevent. And this deterioration, of course, follows the lead of the parental organism. Everything else is stinted (since there is not enough for all) that the nerve-centers may be largely and rapidly developed; and in the first rank of the organs which suffer is the entire dermal sys-

tem, which includes the teeth. The skin itself, the hair, the nails, as well as the teeth, become more delicate, slender, incapable of resistance. And presently comes the second stage of this sad, eventful history. This one-sided little creature is hardly aware of his new surroundings before parents, nurses, and friends begin to stimulate his over-grown nerve-centers, delighting in every evidence of precocity, and pushing him step by step through successive studies and pleasures far beyond his years. What city dentist has not been dismayed to hear of the school and home studies, music lessons, dancing lessons, matinées, balls, and all the rest, which make it difficult to find time for the care of this little darling's half-constructed teeth? And who has not read the end of it all in the mother's elegant mourning? The painful, perishing teeth are an integral part and a fair index of the entire physical condition.

And so we come around, through all these considerations, to perceive that the increasing frailty of teeth is not due to this or that matter of diet or regimen, but is part of the general fact that parents and children alike spend so much nerve-force on the world without that they have not enough left to nourish rightly the tissues within.

But it is time to ask if there be any remedy. Thanks to the marvelous recuperative power of our race, there is. I believe it may be possible, even in the individual, and certainly in the second generation, to turn inward this stream too prodigally wasted without, and utilize for self-support the vast neural power which modern times have developed. Where the income is assured it is only necessary to restrain waste, and wealth will follow. The last twenty years have made a promising beginning in the management of children in dress, diet, ventilation and exercise. But these are only the fringes of the matter. Two things remain of prime importance: First, let conception be to every wife the signal of a new, imperative, and honorable duty, namely, the duty to cultivate all her energy of mind and body in quiet, simple ways, and to stop all waste of nervous force, whether in pleasure, work, or worry; that the new life which feeds on hers may satisfy its great requirements from an ample store. Secondly, let precocity be considered a danger to the child and somewhat a disgrace to the parent,—a thing not always avoidable, but never to be desired or forwarded.

How far off may be the realization of such dreams, it would be foolish to predict. But as one who has an abiding faith in the future, I am glad to observe the beginnings of better things, and I do not hesitate to prophesy that some day all this and more will come to pass. For the present the disproportionate strain put upon the nerve-centers wears out the organism that should serve all the purposes of life. The tool crumbles under the stroke. But let a

few generations of proper regimen bring up the general development to match this enormous energy, and the world will see a race of men whose thought and sinew will tame the elements, and whose teeth will grind for a hundred years the food that feeds them.

Discussion.

Dr. J. Morgan Howe. I cannot refrain from saying that I regard the paper that has just been read by Dr. Dodge as one of the ablest that has ever been read before this society, and I wish most emphatically to give my approval of Dr. Dodge's dissent from the idea which has obtained currency in the last few years, that the secret of the strength of the dental tissues, and their ability to resist deleterious influences, lies in the material or the quantity of it furnished the system. Somewhat more than four years ago, in discussing a paper of Dr. Beers's, read before this society, I made an impromptu but decided protest against that idea; but Dr. Dodge has very ably, and very satisfactorily, to my mind, presented a protest that is worthy our studious consideration, because it is supported by a presentation of theories that appear to me to be based on correct physiological foundations. The notion of supplying lacking material by putting it in the stomach has obtained a very strong hold of the dental mind. It began, perhaps, in brown bread, and was followed by lime-salts introduced as such into the system, and one author has recommended in one of our journals that we should eat ground bone. Lime-salts have also been presented to the exposed pulp, in order that it might be induced to do its duty, as of course it would if it were not that it could not find enough lime to furnish material for a deposit of secondary dentine. These suggestions have appeared to me to reach the climax of absurdity, and Dr. Dodge's paper is, on the other hand, the climax of reason, and, without previous thought upon the subject at this time, I would most emphatically say that the ideas suggested by Dr. Dodge are the true ones regarding the building up of dental as well as other tissues. There is one point made by Dr. Dodge which struck me as questionable. I refer to his statement, as I understood it, that the lime-salts were as much alive as the other parts of the dental tissues. I think that statement is a mistake. I do not think there is any authority for it; neither do I believe it to be true.

Dr. Frank Abbott. I dislike very much to speak on a paper that for the most part so emphatically agrees with my own ideas. For a number of years past I have entertained the views that Dr. Dodge has so ably expressed in his paper, viz., that there was some difficulty existing not due to an insufficiency of lime-salts, which

occasions so many faulty and imperfectly formed teeth. With that idea in view I have advised exercise in the open air and other kinds of treatment for some patients which would favorably affect their digestion. That the food ordinarily taken contains sufficient lime-salts to form and to sustain the teeth I have no doubt (except in cases of extreme anemia, during gestation and lactation). I believe the fault is beyond that. There is a lack of proper nourishment of the tissues, due to imperfect digestion, which depends again upon the proper "nerve tone." I believe this to be the real cause of the difficulty, as stated by Dr. Dodge. It is reasonable to suppose that any *tonic*, whether taken in the form of exercise in the open air, or in any other form, which affects favorably other portions of the body, will affect the teeth favorably as well. When we have *ascertained the functions of the great nerve-centers*, and those functions are assured, then we will probably have more perfectly-formed teeth.

Dr. W. H. Atkinson. I feel like coming to the defense of the statement in the paper to which objection has been made by Dr. Howe. It is not possible, in my estimation, for Dr. Dodge to put the same construction upon his language that Dr. Howe did. That little "as" alive as albumen means in different degree, and you will find that Dr. Dodge is right. We all know that from nitrogen there is a higher functioning power. But that the lime-salts are alive, I am so happy to have it pronounced distinctly in the presence of men who say that matter is sufficient to account for all things.

I have been pained, as others have, at the drivelling idiocy of feeding lime-rocks to mothers, and hearing it advocated by men who ought to have known better. But we must remember that there is another side of the question. Lime is necessary, and those who have had charge of menageries have found it out to their cost. They could not produce perfect lions in confinement until they learned that they required not only a daily flesh diet, but bones also. Had they been able to obtain their own food, which they could not do in captivity, they doubtless would have had a sufficient supply of lime-salts for the purpose of reproduction. But I am so glad to have it plainly stated that it is the operation of the radiancy and the churnings in the digestory process that elaborates the pabulum out of which the tissues are built through the circulation, and that it is this function that has been spoken of as trophic nerve energy that does the work. That trophic nerve energy was referred to as the act of the parents. There I would enter a caveat, just the same as I would when a learned physiologist tells me the liver secretes bile. I would say bile is secreted in the liver, and that through the mechanism of the parents the confluence of plus and minus energies did produce the germ; but that the parents did it

in any adequate sense, intellectually or consciously, I have not the most remote idea. There is a divinity that shapes our ends; there is something in the atmosphere that makes for righteousness; and if we could learn from the gymnasts the profitable part of their lesson it would be well for us. I think it is our over-acting in some directions and under-acting in others that disturbs the imbibition of the radiancy from the sun, and irradiancy from inhabitants of planets, or that which has been called trophic energy in the human system, which operates all the functions of the body, as well as what we call mental operations, referred in the paper to the brain.

Dr. N. W Kingsley. The theories expressed in the paper by Dr. Dodge are those which I have held for many years, and on more than one occasion I have endeavored to express them, but I fear I must have done it so crudely that my hearers did not get the ideas I intended to convey; and so it pleases me exceedingly to see it done so much better than I could do it. Four years ago, before the International Medical Congress, in London, in a paper which I called "Civilization in its Relations to the Decay of the Teeth," I said that I believed the causes of decay were always surrounding the teeth; that the difference between teeth in their liability to decay, or in their succumbing to such causes, lay in their unequal resisting power, and that the resisting power was back in the nerve-centers; that the cause of the trouble was largely not local, but an inability to resist local manifestations. Those ideas were neither entirely novel nor entirely original with me. The same had been suggested, in different forms, by Professor Anstie, of London, who died many years ago, and also before him by Mr. Mummery, of London, in some statistics which he had collated in relation to the decay of teeth in civilized and uncivilized races. In reference to the question of civilization, the reason that I called the paper by that title was that I had frequently heard it said that the cause of decay in teeth was inherent in our civilization; but it is not necessarily a result of civilization that our teeth are decaying, or that our nerve-centers have not the power to resist the causes of decay that surround the teeth. It is the abuse of civilization, and nothing that civilization can be held accountable for. Dr. Dodge put it very nicely when he said that the community is recognizing the causes of faulty teeth, that they are improving upon their condition, and that the day is coming when we may have all of the benefits accruing from civilization that we possess to-day, and yet have learned to resist those deleterious influences that have heretofore led to the destruction of our teeth. The decay of teeth, I am satisfied, will grow less and less, while we retain our mental and physical strength, or even grow intellectually stronger, for we shall learn the secret of

their preservation; and I think that secret has been most beautifully described in Dr. Dodge's paper.

Dr. E. Parmly Brown. It occurred to me while listening to the paper that there were two facts which we cannot deny. One is that we find to-day a terribly bad development of human teeth, and that is found not in high civilization alone, but all over the face of the earth. Secondly, after the teeth are developed something is attacking them from without. The weak teeth go down first before this enemy, and the strong stand up before it the best. The object of these meetings is to bring out different ideas and different ways of accounting for this state of affairs, in order that they may be classified and preserved and made useful. It is not for us to finish this work of investigation, nor to wholly remedy the evil; but, on the contrary, our descendants will work at these problems as we do to-day. But it does not follow that we may not do some good. A burglary has been committed, and you know the teeth are stolen; they are gone or badly injured; but the burglary was committed in the night, and you do not know whether one burglar or ten were engaged in it. But if you suspect one man, or two or three, you have the right to give your reasons for your suspicion, and then it is the business of the detectives to follow up the suspicious individual and find out whether he is responsible for the depredation or not. Children can sometimes throw out little ideas that wise men of science may work out with benefit. I think I can spot the chief burglar in this business, the one who works the greatest destruction after the delicate teeth have been produced. I will venture the assertion that the excessive use of common salt is one of the main factors in the destruction of human teeth to-day. I am now engaged in collecting some statistics on this point, from which I hope in time to demonstrate, what seems to me to be the fact, that common salt excessively used is a great solvent of the human teeth. If it will injure the human teeth through the chemistry of our systems in some way or other that I will not try to explain to-night, why might it not also have the effect of preventing a good development of the teeth when taken into the system in excess? I have lately procured some statistics from the Sandwich Islands, from a gentleman who has been there, covering a period of over forty years, that are very suggestive and interesting. Within that period the teeth of the Sandwich Islanders have decayed rapidly, and since they have begun to decay it has been noticed that the natives are in the habit of biting off great chunks of salt and eating it with their food. According to all accounts, the teeth of the Sandwich Islanders were formerly the most free from decay of any people on the face of the earth, if I remember rightly. You will find that people who eat a great deal of salt and

a great deal of sugar are often entirely toothless. I know several instances of candy-store keepers where three generations are entirely toothless. People who eat an excessive amount of salt are tempted to eat large quantities of candy, pickles, and vinegar. There seems to be a craving for those substances after the excessive use of salt.

Adjourned.

E. T. Payne, D.D.S., *Secretary.*

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held its annual meeting Tuesday evening, April 7, 1885, in the rooms of the S. S. White Dental Manufacturing Company, corner of Broadway and Thirty-second street.

The president, Dr. A. L. Northrop, in the chair.

President Northrop. Gentlemen, we have here a skull and lower jaw, which Dr. Ravel has kindly brought for your inspection. I saw this specimen in Philadelphia, and asked Dr. Ravel to bring it here and show it to the society. We will probably not see another such specimen in a whole life-time. Thanking Dr. Ravel for his kindness in bringing it here to-night for exhibition, I take pleasure in introducing him to you.

Dr. Ravel. Gentlemen, this skull, showing a wonderful exostosis, I brought from the south of France. The subject was born in the southern part of France in 1722, and lived to be forty-six years of age, when he died of pneumonia. He was twelve years old when the exostosis began. I will show you the skull in sections, that you may observe how extremely dense the bone is.

Dr. C. F. W. Bödecker, chairman of the Clinic Committee, reported as follows: The clinic to-day was one of the most interesting that we have had for a long while. The number in attendance was unusually large,—about one hundred and fifty. Dr. C. W. Strang, of Bridgeport, Conn., presented a young patient with necrosis of the lower jaw. The history of the case, as given by Dr. Strang, is as follows:

Joseph F——, now aged seven, presented himself, accompanied by his family physician, for treatment in July, 1884. Upon examination it was found that there was necrosed bone anterior to the inferior first permanent molar on the right side. It appeared, from the history of the case then given, that about December 22, 1883, there was severe pain in the parts, and that a dentist was called upon who extracted the second temporary molar on the right side.

The pain greatly increased after the operation, and the face became much swollen. After about three days the pain subsided, and nothing more was thought of it, but the swelling did not entirely disappear. In June the parents of the boy noticed a portion of the alveolar process protruding through the gum. Treatment consisted in applying aromatic sulphuric acid for several months until the process was exposed to the permanent lateral incisor; the temporary first molar, cuspid, and lateral incisor having, in the meantime, become so loose that they were easily removed with the fingers. Soon after the treatment was begun a fistula formed near the angle of the jaw, from which shortly after a small piece of bone was removed. In January last all the necrosed bone that could be detected was removed. The permanent cuspid was found but partially developed (merely a part of the crown had become calcified), and was also removed The fistulous opening closed immediately after the operation, but subsequently opened again a few weeks thereafter, and there is still a very slight discharge of pus from it. The sixth-year molar is healthy, and reproduction of bone is constantly going on anteriorly. Treatment since the operation has consisted in syringing the parts two or three times daily with phénol sodique, one to four parts water, and an occasional application of aromatic sulphuric acid.

Dr. Hiller presented a case of irregularity, a boy of twelve years, whose mouth was in a terrible condition. The lower sixth-year molars were very badly decayed, as were also the temporary teeth present; the lower first bicuspid on the right side was decayed nearly down to the gum. The irregularity of the upper front teeth was as follows: The right central was nearly in a normal condition; the left central stood crosswise on the side of the other central; the right upper cuspid was situated on the posterior or distal side of the central, and the right upper lateral on the distal side of the cuspid. Some gentlemen thought the extraction of the lateral would be judicious; others advised bringing the lateral around to its proper place, which I do not think is practicable.

Dr. A. R. Eaton, of Elizabeth, N. J., presented a cast of the mouth of a patient, who was about forty years of age, showing that all the lower permanent teeth were in position, except the sixth-year molars, which had been removed, and that the two central incisors were missing altogether, their places being occupied by two temporary teeth.

We also had a test of the merits of the Herbst method of burnishing gold into cavities as compared with the mallet method. Dr. E. Parmly Brown represented the mallet method, Dr. Abbott worked with hand-rotating burnishers, and I appeared for the Herbst method. We first proceeded to fill some glass tubes, which I had

prepared for the purpose, of as near an equal size as they could be made. Each of us—Dr. Abbott, Dr. Brown, and myself—filled one of these glass tubes, the purpose being to show the comparative adaptability of the different systems. Dr. Brown, using the electric mallet, filled a tube in twenty-nine minutes; Dr. Abbott filled one in six and a half minutes, and I performed a like operation in six minutes. The most perfect adaptability was obtained by the Herbst method by rubbing or burnishing the gold against the walls with agate points rotated by the engine. Dr. Abbott used White's velvet cylinders, Dr. Brown used 1000-fine gold, and I used Wolrab's German gold. (Dr. Bödecker exhibited the several specimens.) We also tried the packing of gold into a steel matrix, kindly furnished for the experiment by Dr. Abbott. The results were as follows: Dr. Brown occupied forty minutes in inserting the gold, and the weight of the plug was eighteen grains; Dr. Abbott spent seven and a half minutes, having some one to feed the gold, and the weight was seventeen grains. I took eleven minutes, handling the gold myself, and the weight was fourteen and one-half grains; but my plug did not quite fill the matrix. The record shows, gentlemen, exactly what I have been claiming for the Herbst method of filling, which is that by this process you get a better adaptation to the walls of the cavity than it is possible to obtain by any other method. But I have to add that I was working under great disadvantages. The burnishing instruments that I use all fit the Hodge hand-piece. I, therefore, could not use one of the good S. S. White engines, but had to be satisfied with a very old one, the hand-piece of which was so badly worn that it could not be made to hold an instrument without wobbling while rotating, so that before I had the steel matrix quite filled my agate point fell out of the instrument, and on account of the many persons present it could not be found until the clinic was over. My plug being made with a bad engine, and not quite filling the matrix, was much lighter than it would have been under more favorable circumstances.

Dr. E. Parmly Brown. I am obliged, as usual, to rise in self-defense. Dr. Bödecker forgot to mention that in taking his filling out of the matrix it broke in halves, and that Dr. Abbott's plug also broke in removing it.

Dr. Abbott. One point in connection with the clinic that should be taken into account is the style of gold used in these operations. The weight of the cylinders used by Dr. Bödecker was two or three times as great as that of those used by myself; consequently it took me much longer than the same operation would take if I had used larger cylinders. I said at the clinic that I could make one of those fillings in three minutes by using cylinders of the same size as Dr. Bö-

decker used, and I think I could easily. Another thing is that I had a man to feed the gold to me, while Dr. Bödecker fed his own gold; and that would make a difference the other way; so that, taking it altogether, I think the tests were very fair. They showed the merit of condensing the gold more thoroughly in the center of the cavity, while surely and easily adapting it to the walls. I think those facts were brought out very clearly.

Dr. W. D. Tenison. Mr. President and Gentlemen: I rise to announce a sad occurrence, in the death of one of the oldest dental practitioners in the city of New York, Dr. Otis Stanfield. I had known him for thirty odd years; he was at one time my preceptor. He was not a member of this society, but as a dentist he stood very well in the city. He entered upon the practice of his profession in 1835, and retired from practice in 1872. His death occurred very suddenly on Saturday, April 4. He was apparently in perfect health up to within fifteen minutes of his death.

Dr. W. H. Atkinson. I have a similar event to announce. Dr. J. G. Ambler, of this city, has passed away very much as did Dr. Stanfield. He worked, as I am informed, until office hours were past; then went home, and was dead before twelve o'clock that night.

The annual reports of the various officers were then called for and read, followed by the president's address, after which the following were elected officers for the ensuing year:

William Carr, president; J. F. P. Hodson, vice-president; B. C. Nash, secretary; Charles W. Miller, treasurer; J. B. Littig, librarian. The committees appointed are as follows: W. W. Walker, A. L. Northrop, C. E. Francis, executive committee; C. F. W. Bödecker, W. H. Atkinson, and F. H. Lee, clinic committee.

Adjourned.

The society held a regular monthly meeting, Tuesday Evening, May 5, 1885, in the rooms of the S. S. White Dental Manufacturing, Company, corner of Broadway and Thirty-second street.

The president, Dr. William Carr, in the chair.

Dr. C. F. W. Bödecker, chairman of the Clinic Committee, reported as follows: At the clinic this afternoon there was an attendance of about fifty. The operators were Dr. J. C. Nisley and Dr. C. A. Timme. Dr. Nisley filled the distal surface of a right upper central, the cavity involving a portion of the cutting edge of the tooth. The operation was begun with Wolrab's German cylinders, and finished with "Globe" gold, number thirty, the soft gold being used against the walls of the cavity, and the heavy gold in building the remainder

and the contour. The whole operation of packing the gold was completed in thirty minutes, and was very nicely done. Dr. Timme filled a right upper first bicuspid, the cavity in which involved the distal and grinding surfaces, using Wolrab's gold cylinders and the Herbst method; also the mesial surface of a right upper lateral by the same method. Dr. Swartout, of Utica, presented a new preparation of phénol sodique. Dr. W. T. La Roche presented a case of irregularity, the patient being about sixteen years of age. The irregluarity consisted of a very narrow arch, the cuspids standing altogether outside and the second bicuspids inside of the arch. The lower teeth were nearly in proper position, except that the second bicuspids were prevented from fully coming through on account of the first molars leaning over them. It was advised by some that the first molars be extracted, and others advised the sacrifice of the second bicuspids.

Incidents of Office Practice.

Dr. E. A. Bogue. I would like to know whether any of the gentlemen present have used veratria in the last year or two. Since the effort to make cocaïne servicable in the excavation of cavities in teeth, I have been comparing its advantages with those of veratria, which drug was brought to the notice of this society two years ago, and I have found that veratria, as I have it prepared, has been of far more service to me than cocaïne has. By leaving it in the cavity, the rubber-dam being in position, while I go on to prepare and perhaps fill another small cavity in the neighborhood, the more important cavity when I return to it is found to be nearly obtunded, and I am able to excavate with little or no pain to the patient. After having left it in the cavity a few moments, I wipe out the cavity with alcohol and dry it. I can then apply hot air, if required, without pain to the patient. The formula is six minims of absolute alcohol, six grains of veratria, with an equal quantity of pure carbolic acid, and five drops of glycerin. Prepared in that way I find it works admirably.

Dr. C. E. Latimer. When you combine carbolic acid and something else with the veratria, how do you know that the effect is due to that agent and not to the carbolic acid, which acts in the same way?

Dr. Bogue. Because I have tried each one separately. Each element constituting the remedy has been tried by itself. I have tried the glycerin and tannin called Näboli, and alcohol and chloroform. I set myself to thinking in what way they operated. I imagined that glycerin, having a strong affinity for water, drew out the water in the dentinal tubes. The next step was to use hot air,

which I did, and it hurt the patient very much. I put in carbolic acid to get rid of that hurt, and in a few moments thereafter I dried out the cavity and turned on the hot air. I could then finish the excavating without trouble; at least I did so a good many times; occasionally I had a failure. Looking among the alkaloids I tried veratria, hyoscyamus, and atropia, and some others, but none of them acted as well as veratria. I have been using it for about three years with very satisfactory results. The reason I brought it up this evening was that in reading an article of Dr. Abbott's, and some others as well, I was impressed with the chance of their being wrong. It is, I believe, the experience of those who have experimented with cocaïne that its action is from toward the center outward, and not from the peripheral extremities of the nerves inward, and I was not at all surprised to find that we got no special action in the majority of teeth in which it was placed, though we do sometimes in children's temporary teeth, where the structure is so loose. But when I saw in one of the journals the statement that it was useless to expect any effects from any remedy applied in the cavity of the carious tooth, I took issue with it from the fact that we have in veratria a substance that will act efficiently in, I think, three-quarters of the cases. Whether I am correct in my reasoning or not I do not pretend to decide, but the facts I do know.

Dr. Latimer. How about cases of sensitive dentine in extremely dense teeth?

Dr. Bogue. I think those are the cases in which there is the least trouble, and the ones in which remedies are the least liable to act.

Dr. Latimer. What is the nature and general influence of veratria? If I remember rightly, it is used for controlling nervous action and the heart's action.

Dr. Bogue. I cannot undertake, off hand, to discourse on that subject. I do not know enough about it to trust myself to speak on it. It is a powerful irritant and poison, but diminishes the irritability of many of the nerves, especially of the cutaneous nerves.

Dr. Bödecker. With regard to the obtunding qualities of veratria in combination with glycerin and alcohol, I can say that I have used it within the last two years in a good many cases, in some of them with excellent results; especially in those cases where there is a good deal of soft decay around the cervical margin of the cavity. In very sensitive places, situated between the boundary of the enamel and the dentine, I have never seen any change in the sensitiveness of the tooth, but in cavities running up under the gum I have derived great benefit from the application of this obtundent.

Dr. J. Bond Littig. I have been using for some little time a solution of cocaïne in absolute alcohol, and with very happy results.

From my experience with it I think it will produce the same effects as the preparation of veratria Dr. Bogue has spoken of. Alcohol seems to be an obtundent of itself, and I think has a great deal to do with the efficacy of the preparations with which it is combined.

Dr. Bogue. I asked permission of the president to refer to a matter this evening that I wanted to speak of at the last meeting. At that meeting Dr. E. Parmly Brown started to make some remarks in regard to the operations which had been performed at the clinic that day, and as he was technically out of order, he sat down, and did not resume his remarks, although given permission to do so. I regret that he did not tell us what he knew "about farming," for I feel convinced that we would all have been edified, because not only would the different systems that were severally advocated by the three gentlemen who operated—Drs. Bödecker, Abbott, and Brown—have been discussed, but, what is far more important, the ideas that underlie those systems and upon which they are based. The report of the Clinic Committee concluded with a statement that particularly struck me, that the Herbst method was the most accurate method of adapting gold to the walls of a cavity; that the method adopted by Dr. Abbott, viz., filling with smooth, round-pointed hand instruments, was next most accurate, and the electric mallet was inferior to either. The report left out of view the individual characteristics of the three gentlemen who operated, and their different ideas and varying skill. It also left out of view the fact that the operations were being made in steel and glass matrices, substances which differ widely in their character from tooth-structure, and which will allow of entirely different manipulation. The subject was not properly discussed, and as the principles involved were not new, but only the application new, we are quite competent to discuss them intelligently and with practical advantage. When Dr. Atkinson some years ago brought out his smooth-pointed pluggers, and Dr. Shumway advocated ivory points for cohesive gold, and Dr. Bronson advocated a small burr to put the gold into a hole that had been formed by a round burr, and Dr. Jack devised a set of matrices and recommended polishing the interior of the cavity with pumice-stone after shaping it with paraboloid chisels, they were all laboring at the same problem that Herbst has attacked with his burnishers in the engine and his soft but cohesive German gold. I would like to see the subject taken up and discussed in a way to bring out the facts that are lying pretty near the surface.

Dr. Bödecker. I do not think the subject Dr. Bogue has spoken of was discussed at all at the last meeting. The Dental Society of the State of New York, however, has announced the discussion of the Herbst method at its next meeting, and I shall then exhibit

some new preparations lately sent to me by Dr. Herbst, and then any of the gentlemen may pick them to pieces,—not for the sake of glory to anybody, nor because I happen to represent the Herbst method here, but for the sake of getting at the truth. I believe I have derived a great deal of benefit from this method of packing gold, and I should like every dentist to do the same.

G. W. Weld, M.D., D.D.S., read the following paper, entitled

Chloroform and the Fifth Pair of Nerves.

Under the head of "Current News and Opinion," in the March issue of the *Independent Practitioner*, there appeared a short notice relating to chloroform and the fifth pair of nerves. The article in question briefly referred to W. E. Buck, physician to the Leicester Infirmary, who, it would appear, had stated in the London *Lancet* that "*if a patient be not thoroughly under the influence of chloroform*, any irritation of the fifth nerve will produce slowing of the heart's action and final stoppage through the pneumogastric nerves." He thinks this may account for many deaths in dentists' chairs, and advises that "in any operation involving the fifth nerve the *anesthesia* should be pushed until the patient is completely under its influence."

This article is not only somewhat meagre in its details, imparting but little information regarding the *shock* which may occur during chloroform administration, but, in some respects, is calculated to mislead, if at the same time some other points be not considered. Although I may not add anything new to what is already known regarding the influence which the fifth pair of nerves may have in connection therewith, it is, nevertheless, to these points that I wish particularly to invite your attention this evening.

That chloroform, when employed, should be administered until the patient is completely under its influence,—i. e., oblivious to pain,—is self-evident, and requires no comment. Under some morbid conditions it is perhaps true that incomplete anesthesia is a condition of danger. Bartholow* refers to this, and says that "numerous accidents have occurred from the use of anesthetics for trivial operations,—notably for extraction of teeth, in which but a partial degree of insensibility is induced. In such cases the heart, enfeebled by chloroform narcosis, is suddenly paralyzed by the reflex action proceeding from the peripheral injury. The district of tissue supplied by the fifth nerve is an especially dangerous region, owing doubtless to the intimate connection of the nucleus of the fifth with the nucleus of the pneumogastric. By far the largest number of fatal cases have resulted from a neglect of this rule. It is never safe," continues

*Bartholow's Materia Medica (Roberts Bartholow, Phila., 1881), page 362.

this writer, "to proceed in a surgical operation with anesthetics unless complete insensibility has been produced."

But Trousseau and Pidoux have attributed the number of cases of fatal chloroform narcosis which have occurred in England to the fact that "the just-mentioned rule is adhered to by English surgeons." Their words are as follows: "En Angleterre les chirurgiens portent l'éthérization jusqu'à l'abolition de toutes les facultés animales, jusqu'au commencement de la period d'éthérisme organique. Plus prudent sous ce rapport que leurs confrères de la Grande-Bretagne, les chirurgiens Français ont l'habitude de s'arréter dès que la sensibilité aux excitations de la peau est abolie et que la résolution musculaire commence. Cette prudence explique comment les chirurgiens Français ont éprouvé moins d'accidents graves et compté moins de morts subites." (Vol. II., p. 322.)

The impression likely to be conveyed in the article referring to Dr. Buck is that, by *pushing* the chloroform until the patient is completely under its influence, the chances of heart failure may be avoided. The fact is that chloroform, and especially if its administration be *pushed*, sometimes results in a fatal termination, irrespective of any irritation which may be conveyed to the pneumogastric centers through the fifth pair of nerves. Heart failure has taken place during chloroform administration, prior to the surgical operation, or the extraction of a tooth, and consequently before either the fifth pair of nerves or the pneumogastric centers, so far as the surgical shock is concerned in the matter, had become involved. Moreover, fatal results from chloroform narcosis are more frequently due to cerebral anemia, induced by the upright position of the patient, who sits or reclines in the dental chair. Hence a position as near horizontal as possible is always advised whenever chloroform is administered. It is apparent, therefore, that although the chloroform be pushed, the chances of cerebral anemia and fatal syncope occurring during its administration still remain.

In connection with the fifth pair of nerves and the shock occuring under chloroform administration, the views of Bruton are worthy of consideration. Bruton states that the blood, when it reaches the veins, is useless for nutrition of the tissues, as we see in the corpse, when the whole of the blood in the body is contained in the veins, the arteries being empty; only so long as it is in the arteries can it maintain the vitality of the tissues. The blood is kept in the arteries, first, by fresh supplies being pumped out of the venous system into the the arterial by the heart; second, by the contraction of the arterioles, which prevent it from running back too quickly into the veins.

When a tooth is drawn *without chloroform*, the irritation is carried

by the fifth nerve to the nerve-centers. It irritates the vagus roots, and also the vaso-motor center. The irritation of the vagus may depress or arrest the heart's action so that no blood is sent into the arterial system for several seconds; but this is counterbalanced by the irritation of the vaso-motor center, which causes contraction of the arterioles, and thus correspondingly diminishes the outflow. In a person *thoroughly under the influence of chloroform, both nerve-centers have their reflex sensibility abolished*, and so the irritation has no effect on either; but with *partial anesthesia* (and this is doubtless the idea Dr. Buck intended to convey) the vaso-motor center may be rendered insensible before the vagus center, and consequently, when the irritation is applied to the fifth nerve, the vagus center only is excited, the heart is depressed or stopped, and the inflow of blood into the arterial system is diminished or arrested, while there is no contraction of the arterioles, and therefore no corresponding diminution of the outflow. The arterial system, therefore, becomes more or less empty,—i. e., it approaches more or less to the condition of death, and fatal syncope may result.

With nitrous oxide gas, however, by which the blood in the arteries is brought into venous condition, and thus acts as a stimulus to the vaso-motor center, the danger from syncope is reduced to a minimum.

Thus we find that during the administration of chloroform for dental operations there are a number of factors which tend to produce a failure in the heart's action. First, a depression of the functions of the heart by chloroform narcosis *per se*,—in other words, when the paralyzation of the cardiac ganglia is due entirely to the effects of the chloroform; second, the upright position of the patient, which induces cerebral anemia; third, the supposed reflex action of the pneumogastric nerve upon the heart through the irritation of the fifth pair of nerves. These causes may, of course, act either separately or simultaneously, but in either case the heart's action is depressed or completely arrested. The sudden deaths which sometimes take place at the beginning of the inhalation of chloroform have been accounted for on the theory that the cardiac ganglia are in an abnormal state of susceptibility. Whether this supposition be correct or not we cannot say; we only know that there appear to be certain morbid conditions which tend to syncope. These conditions are found in alcoholic subjects, in persons who have sustained a severe shock from an injury, or one afflicted with a fatty heart; and it has also been observed that children and women (especially in labor) are better subjects than adults and men.

It would appear from what has been said that ether or nitrous oxide gas should be used in preference to chloroform in all dental or

surgical operations. In fact, it is maintained by a large majority of observers at the present day that only in extremely hot climates, and in expeditions where ether, on account of its bulk, cannot be carried, is its administration fully justifiable. Statistics * show about one death occurring in every three or four thousand cases,—a condition of things which, if the statistics are of any value, certainly imposes an immense responsibility on the administrator. But chloroform has been used quite extensively in England and Scotland, and is now used by most of the English surgeons in preference to ether. In this country, as well as in Germany and Italy, it is used but little in general surgery. It has, however, been employed to a small extent in some of the wards in Bellevue Hospital, and so far as known without fatal results. It is almost universally used as an anesthetic in obstetrical cases.

Dr. Alexander B. Mott, of this city, may be considered the progenitor of chloroform narcosis in this country, he being the first to administer it on this side of the Atlantic. This occurred in 1849, when it was administered for the removal of a cancer from a woman's breast, the operation being performed by Dr. Mott's father. Singular to relate, although the cancer returned, and another similar operation was performed, this woman is still alive, and so far as known is free from the disease.

If it were possible to remove all danger from cerebral anemia and heart depression, chloroform would be the best of all anesthetics for capital operations. It has many advantages over ether. It produces less emotional excitement. It is as much quieter in effect than ether as ether is than alcohol. Thus the unpleasant after effects of ether are entirely absent; the patient coming out of a state of unconsciousness apparently like sleep.

In view of these facts, it is important to ascertain, if possible, when it is found necessary to administer chloroform, the best means to employ to prevent the shock or depression which the heart at times appears to sustain, to a greater or less extent, whenever it is administered, and especially so if the heart be depressed by any irritation conveyed to the vagus centers on account of a peripheral injury.

Dr. Alexander B. Mott has been in the habit during the past thirty years of using chloroform in his practice, and up to this date has had no fatal results. He attributes this to the careful manner of administration, and the prompt and efficient remedies employed to resuscitate the patients when it is observed that their breathing is impaired, or that they appear to be in danger of heart failure or

* Concerning the mortality from chloroform narcosis, statistics vary considerably.

cerebral anemia. But with him this seldom occurs, a circumstance which may reasonably be attributed to the precautionary measures taken to prevent such an occurrence before the inhalation; for he is in the habit of giving to his patients before each surgical operation a moderately large dose of whiskey or brandy, and furthermore is prepared to administer it subcutaneously if necessary.

It must be considered somewhat doubtful whether the many deaths which have occurred in dentists' chairs from the effect of chloroform can be reasonably ascribed to any condition of incomplete insensibility. What seems more probable, in the light of modern investigation, is that the slowing and final stoppage of the heart is induced alone by the effects of the chloroform or the upright position of the patient, rather than to any reflex action of the pneumogastric upon the heart. It is very likely that in many cases of heart depression and failure the result would have been entirely different had the above precautionary measures been taken, and in many other cases where heart failure occurred the patients would have survived had prompt and intelligent efforts been made to resuscitate them. It is thus apparent that the present statistics relating to the number of deaths due to the administration of chloroform are of little or no value.

A number of expedients* have been proposed to prevent the heart depression coincident with chloroform narcosis; but for various reasons, principally because of ether when inhaled is a cardiac stimulant, and in consequence is comparatively free from danger, no reliable formulæ have been proposed, or at least accepted, by the medical profession. As above stated, it has been suggested to give the patient a dose of whiskey or brandy before the inhalation has begun. But it is apparent from what has already been said that for one class of patients—viz., those with an alcoholic history—this remedy alone must prove uncertain and unreliable in its effects. Nassbaum, a celebrated German surgeon, proposed to administer a subcutaneous injection of morphia. It has also been proposed to mix a small quantity of the nitrate of amyl with chloroform at the time it is given. Sulphuric ether in conjunction with chloroform (mixed vapors) has often been administered in the same manner and with the same purpose in view. It is a well-known fact that ether, when administered internally, is a cardiac stimulant. Thus, it has been observed that in sudden and dangerous forms of syncope ether, or Hoffman's anodyne, given internally, has had the effect to

* Bartholow, in a prize essay entitled "The Physiological Effects and Therapeutic Uses of Atropia and its Salts," says: "The subcutaneous use of atropia before the administration of chloroform lessens the dangers of paralysis of the heart and respiration."

arouse a flagging heart and so prolong life. When ether is used as an anesthetic the heart is supposed to be the last organ affected; if a patient dies during its administration, the fatal result may be attributed to asphyxia or paralysis of the respiratory muscles. It is probably due, as just stated, to the stimulating effect which ether has upon the heart's action that it is generally administered in a great majority of operations pertaining both to surgery and vivisection. But deaths have occurred from the effect of the administration of chloroform and ether combined, which fact tends to show that ether, when mixed with chloroform, is not as an antidote powerful enough to prevent or arrest the depressing influence which chloroform seems at times to hold over the heart's action. There is one other point to be considered in this connection, viz., that when chloroform is properly administered it is inhaled by the patient under a napkin and adulterated with at least ninety-five per cent. of air. Formerly, when chloroform and ether were administered together, the proportions were equal parts. At the present time, however, it is customary to use three-fourths ether and one-fourth chloroform.

The element of danger which is coincident with the administration of chloroform and ether combined lies in the fact that the methods prescribed for the proper administration and adulteration of the chloroform are not strictly observed. In other words, the *mixture* is administered from a cone, as when ether is administered alone, and so the patient receives more chloroform than if properly administered by itself.

It is obvious that the drugs or combinations of drugs which have a tendency to paralyze the pneumogastric nerve, or remove the restraint which this nerve has over the heart, thus increasing the heart's action, or whatever agents have a tendency to stimulate the vaso-motor system, thus contracting the arterioles, must serve to produce an antidotal effect, and correspondingly diminish the chances of a fatal syncope occurring during the inhalation of chloroform.

It is true that physiological chemistry has not as yet given us any absolute antidote for the depressing effects produced by chloroform; but clinical medicine teaches us that by the administration of morphia and atropia combined we can to a great extent abolish reflex irritability, increase the power and number of beats of the heart, and maintain the elasticity and contraction of the arteries.

If from a physiological stand-point the theory of nerve inhibition be questioned, it must nevertheless be admitted that, so far as the heart is concerned, the use of atropia in conjunction with the administration of chloroform is inclined to ward off, at least, any influence which tends to depress or arrest its action. This is precisely

what is required when chloroform is administered, or when, from whatever cause, the pneumogastric nerve is irritated. But beside the tendency which atropia has to increase the number of heart-beats or ward off any influence which tends to stop the action of the heart, it stimulates the vaso-motor centers, and it is said, "produces a contraction of the muscular fibers between the elastic layers of the arteries, and also of the external muscular layers of the capillaries." When the nerves which preside over the functions of the arterial contractibility are paralyzed, there is in consequence a stagnation of the blood current,—a condition which necessarily involves more duty upon the heart; in fact, the heart is called upon to force a stream of blood through a series of paralyzed vessels, instead of vessels endowed with life and contractibility, and which, as already intimated, afford assistance in circulating the blood. Morphia adds to the efficacy of atropia, inasmuch as morphia in small doses is a cardiac stimulant.

Atropia and morphia combined have recently been suggested as a remedy for cholera,* on the theory that cholera dejections and vomiting were due to a paralysis of the vaso-motor system, and that the serum of the blood transudes the mucous membrane of the stomach and the intestinal tract, in consequence of their meeting with the least resistance, and that, if proper medicaments and restoratives can be administered to keep up the heart's action and the respiratory functions, the patient might survive what otherwise would be a fatal attack. In connection with the treament of cholera and the combined effect on the heart and blood-vessels of these two drugs, when *administered hypodermically*, this writer further observes that "atropia dries up the mucous membranes from the fauces to the rectum. Whether it be in consequence of its control of the inhibitory nerves of the heart, or a tonic spasm of contraction of the muscular layers of the blood-vessels, I cannot say; but that it is a dryer of mucous membranes there is abundant evidence to show. Furthermore, we know that morphia controls spasm; that it subdues pain; that it promotes quiescence, and that it has a tendency to keep the blood-vessels, and more especially those of the spinal cord, in a distended state, thereby for the time being maintaining the spinal cord in a state of vascular plentitude, which stimulates to proper functioning." But what is equally important in this connection is that after the administration of morphia reflex action seems to be less pronounced. Again, the hypodermic administration of these two drugs combined, before the inhalation of the chloroform has begun, not only increases their physiological and an-

* "Cholera, as Regards Quarantine, and its Prevention, Pathology, and Treatment." By Montrose A. Pallen, A.M., M.D., LL.D., *Medical Record.*

tidotal effect by preventing or arresting the depressing influence on the heart's action, but the disagreeable features of both, as observed when employed by themselves, are materially lessened.

With a view of ascertaining just how far the reflex action of the pneumogastric nerve effects the heart through the irritation of a sensory nerve, the writer has recently experimented on animals with the following results: In a sheep (which had been chloroformed), after the heart had been carefully exposed, five teeth were extracted under various stages of chloroform narcosis without producing any visible effect in the frequency of the cardiac pulsations. But a subcutaneous injection of morphia and atropine had a marked effect upon the heart's action, the number of heart-beats being preceptibly increased and a more forcible impulse of the ventricular systole indicated. This experiment was repeated on a dog (four teeth being extracted) with almost similar results. So far as it is possible to judge from these experiments, there seems to be no good reason for believing that a reflex action of the pneumogastric nerve upon the heart through the irritation of a sensory nerve—at least the fifth pair of nerves—ever takes place during the administration of chloroform.

The special point to be noted is that in a great majority of instances fatal results from chloroform inhalation may be attributed to cerebral anemia and some fault in the administration, rather than the effects produced by giving less than the usual quantity of chloroform or producing incomplete insensibility. Whether morphia and atropine combined, and employed subcutaneously, will prove to be an effectual antidote for the paralyzing effects induced by chloroform, time and experience alone can determine. One point, however, seems to be clearly settled, viz., that whatever the cause may be of fatal syncope during chloroform narcosis, the remedies most likely to prove of any value must embrace those remedies which are calculated to ward off an attack of heart failure, rather than those remedies which are generally adopted for resuscitation after an attack. This is made apparent by the fact that many deaths occur suddenly, and consequently the agents which are calculated to strengthen the cardiac and respiratory functions are applied when it is too late, and of course prove to be useless.

Discussion.

Dr. W. H. Atkinson. This is a subject, Mr. President, that I hardly like to speak upon, because it is a subject that requires more deliberation to pronounce an opinion upon than any set of men discussing it in this way have ever given it, in my estimation. You know I am rather rabid against anesthesia of every kind, and I think that

opposition is founded upon correct principles and an intelligent understanding of the functioning action of the human organism. I have been pained beyond expression by the weakness shown by some of the medical fraternity in yielding to the popular demand for having surgical operations made without pain. It seems to me that they have lost their moral powers, for I know that no surgeon is worthy to be called a surgeon who cannot make any surgical operation that ought to be made upon a human being, if he have control of the case, without an anesthetic. What does the knowledge we possess respecting chloroform or any other anesthetic amount to? Just to this: That we know the blood tension is disturbed. That is all we really do know. Whether there is a hereditary endowment or constitutional idiosyncrasy in some individuals by reason of which a certain amount of chloroform will kill them, while others are so constituted that it seems almost impossible to kill them, we cannot determine. I have not knowledge enough to pronounce opinions with regard to this matter, beyond that which I have pronounced *ad nauseam* to every audience of dentists I have spoken to in this city. I am dead against general anesthesia in general surgery as well as dentistry. Why am I interested, then, in those other articles for preventing pain that have been presented to us, such as cocaïne and the alkaloids? Because they are local anesthetics. I pity the conscience of the man who is willing to put his fellow-being in a state of unconsciousness that he has no warrant or assurance of being able to bring him out of.

Dr. C. P. Fitch. This is a somewhat difficult subject; difficult because we have to deal with occult action. There is much diversity of experimentation in the matter, and has been for years. I think the paper read here this evening is in the right direction of examination and investigation. All these investigations run out into the physiological and functional action of the system, and that is the only road by which to arrive at correct conclusions with reference to the administration of these agents. I apprehend that much of the danger in the administration of chloroform has been avoided in the hands of many gentlemen by the care with which they have administered it. To the anemic patient, and to the person wanting in blood, I certainly would not give chloroform. In cases of confinement we find a plethoric condition of the patient; the blood-vessels are full, and therefore we do not get any reflex action. In the extraction of teeth for a full-blooded, plethoric patient there is not as much danger under its influence as when the patient is lacking in blood. I have abandoned the giving of chloroform for many years, for the reason that I do not know enough about it. I think this is a subject that it would be well to investigate as far as we are able to push

our researches. Dr. Weld's paper I regard as the best I have heard upon the subject as a compilation. I was very much interested in it.

Dr. Atkinson. Dr. Fitch's remark, that a full or plethoric condition of the circulation was in some degree a surety against mischief in the administration of chloroform, suggests a case that I wish to refer to. It is the case of a lady in labor, with her sixth or seventh child, I think. After labor had set in she was seized with a violent toothache in a tooth that was not much decayed; the successive periodic labor pain that should have been in the uterus was translated to the tooth, and the labor did not progress. The attendant advised her to have the tooth extracted, to which the patient objected, and said that if something were put in the tooth to relieve it she thought the labor would go on. That was done, and was repeated several times, the normal action returning and the successive labor pains coming at very regular periods, but without advancing the labor. Usually theretofore her confinement had occupied about six hours, but this had lasted thirteen hours. The physicians advised the extraction of the tooth; the patient consented; it was taken out, and the baby was born within an hour. How much do we know about that? What do we understand about that curious kind of translation of the point of pain; and what is the pain? Is there any curious mechanism of muscular action in the teeth that could bring out in them that peculiar kind of griping pain that is known as labor pain? or is that all a figment of woman's mind, and was the pain really in the uterus and only transferred mentally to the tooth? There are a great many questions in this connection that are not settled. I have many times had patients ask me to extract an inoffending lower central incisor, saying they knew very well where the pain was, and insisting upon my taking that tooth out. I look in the mouth and find a third molar in bad condition; I touch it, and the patient says, "There; didn't I tell you so." I take out the really offending tooth, and the trouble is relieved. Dr. Fitch, in speaking of Dr. Weld's paper, also said it was a complicated and difficult subject to follow. I am glad of it. It *was* difficult to follow. But to whom was it difficult? The people who have not threaded the same mazes that the writer of the paper has traversed. These things ought not to be difficult; we want them made clear to us by reading between the lines, discerning, correcting, and restating. The paper, in so far as it goes, is an excellent one. It wants some elaboration and continuation, something that would be a sort of summing up of the main facts, so that those of us who are not as learned as the writer of the paper is might carry away something useful. I think the best papers are often not sufficiently digested and brought down to the point of demonstration.

Dr. W. H. Dwinelle. I rise more particularly to say that I think a paper of this kind ought not to be passed by without some commendation. It certainly pursues the subject in the right direction. There are more objections to chloroform than to any other anesthetic, but these objections may in time be overcome and the ill effects entirely modified. As has been suggested, it may be difficult to follow the line of thought in the paper closely, yet this is but a beginning of the subject which it would be well for us to pursue and investigate still further; and ultimately chloroform may be robbed of its terrors to a great degree, if not entirely. At any rate, we cannot get too much knowledge upon the subject of anesthesia. If such articles as the admirable one we have just heard had been written years ago, studied and followed up afterwards, we would be a great deal further in advance than we are to-day. My friend Dr. Atkinson will indorse this sentiment. Chloroform is popular abroad, especially in Scotland where it originated, and ether is scarcely used at all. While it is true that the number of deaths from ether is much less than from chloroform, yet chloroform has such decided advantages over ether that it is preferred notwithstanding the extra risk, relying on the restorative remedies in case of emergency. A course that has been pursued to a very large extent in the administration of chloroform and ether, and which I think is a very general practice now, especially in long-protracted surgical operations, is the injection hypodermically of atropine and morphine. The effects of the anesthesia are modified to a very large degree. In the first place, the patients are more readily influenced by the anesthetic, and in the second place they recover from its effects in a more kindly manner than they otherwise would. It also greatly obviates nausea, and insures the patient against the long and severe vomiting which is very apt to follow the administration of either anesthetic without it. The loss of cerebral action while under the influence of chloroform is occasioned by the blood leaving the brain, partly in consequence of the upright or reclining position in which the patient is sometimes placed; and it has been demonstrated that if a patient while in that condition is taken by the heels and held head downwards, the blood by gravity goes to the brain; cerebral action is stimulated and life restored. The tonics or restoratives under these circumstances are ammonia, the atropine group, strychnine, the shock of cold, heat, electricity, and artificial respiration, all of which those who have had experience with chloroform are familiar with. I presume I have given chloroform many scores of times, and under its influence performed most of the operations known in surgery. I have no doubt I have had twenty or thirty patients who, under its influence, were dead, to all intents and purposes, and who would

have remained permanently so if proper restoratives had not been used. I have never, however, had a fatal case, and my confidence in my remedies was such that I was not even apprehensive of one. If in pursuing this line of investigation regarding chloroform we should be enabled to so modify and control its influence that it will be non-dangerous, it will certainly prove a great boon to humanity. I am very glad that Dr. Atkinson stands parallel with me in indorsing the excellent paper we have heard to-night. It is a good beginning towards the great end that lies, perhaps, beyond the reach of the present generation.

Dr. Weld. The paper was not intended to advocate the use of chloroform as a general anesthetic. The object was to show that when death did occur under its influence it occurred through want of proper information in regard to its administration and the proper means of restoration; that it was through the influence of the chloroform and the upright position of the patient, instead of a reflex action of the pneumogastric nerve upon the heart through the irritation of a sensory nerve.

Adjourned.

B. C. Nash, D.D.S., *Secretary.*

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

The regular meeting of the Odontological Society of Pennsylvania was held Saturday evening, March 7, 1885, at the residence of Dr. H. C. Register, 1907 Chestnut street, Philadelphia.

President Guilford in the chair.

The following paper was read by S. B. Luckie, D.D.S., upon

The Setting of Porcelain and Other Crowns.

The placing of an artificial crown upon a root is the last operation the dental practitioner can perform to retain the service and appearance of the natural tooth. It is therefore incumbent upon him to use every precaution to avoid any accident that might interfere with a possible necessity for a repetition of the operation. To meet the many requirements that present themselves, it is necessary to be eclectic in the selection of a crown, and to endeavor to restore to usefulness and beauty the organ in the simplest manner, yet give to the operation when completed the greatest strength in every part.

The Bonwill crowns are sufficient to meet the requirements in a large majority of cases, and their construction and method of attachment have been frequently explained by Dr. Bonwill. There

are some additional points, however, which I think may well be considered. After the root is prepared, to prevent splitting it, a small groove should be cut around the canal, between it and the cementum, which, when the pin is adjusted, the root filled, and the crown pressed to place, will solidly fill with amalgam and support the root on all sides.

If it is a root in the anterior of the mouth, the exhibition of a discolored joint may be prevented by placing a small quantity of light-colored gutta-percha, softened by heat, around the edge of the concavity of the crown, and at once adjusting the crown. A tight joint will thus be made, which will prevent the showing of the amalgam externally. Any excess of gutta-percha which may have been forced out should be trimmed off flush with the root and crown.

If a case presents where decay has progressed to such an extent as to leave only a funnel-shaped cavity, and but little substance for retaining the pin near the apex, a thin platinum band should be placed around the root, with a strip from it, to be turned and burnished into the cavity, to prevent the band from slipping beyond the edge of the gum. Then close the foramen, select a small probe—a Gates canal-drill with bur broken off answers well—and insert it in the root and pack amalgam around it; using either the Bonwill or the electric mallet to work the mercury well to the surface, removing the mercury with a piece of bibulous paper, and so manipulating the amalgam as to have it hard by the time the filling is completed. Then withdraw the probe; this leaves a canal that answers well as a guide in drilling. You now have a root almost as good as if it had not been injured by decay, and the operation can be continued after the usual method.

When the root is perforated in one or more places, I use a piece of platinum foil, cut into a shape that may be adapted to the walls of the canal, as a lining. For success in the use of these crowns, it is important that an amalgam of great strength be used; for, with inferior amalgam, the permanent building up of badly disintegrated roots is impossible. Low grades of amalgam are also subject to discoloration, which may be apparent through the porcelain, and they are therefore objectionable.

Experience has satisfied me that the attachment of these crowns to roots with amalgam, and a pin whose surface will amalgamate, is the strongest method that can be used; and so great is my faith in it, that I take advantage of the mechanical principle in building contour fillings of amalgam in bicuspids and molars.

Cases will, however, present themselves when the articulation will not allow a porcelain crown of sufficient strength to be used.

The inferior incisors and superior laterals frequently have roots so small as to prohibit the adoption of this method. For the roots of such teeth I prefer a platinum and iridium pin for the canal. A gold collar is made to fit around the root and beveled on the labial surface beyond the free margin of the gum. A gold plate soldered on the beveled surface of the collar makes a cap for the end of the root. Adjust the cap on the root, select a suitable plain plate tooth and back it with gold, fitting it upon the cap and attaching it with resin and wax. Remove the tooth and cap; invest and unite with solder. After polishing the piece, attach it to the root with oxy-phosphate of zinc.

For the roots of bicuspids and molars, a very permanent crown can be adjusted by making a cylinder of gold to fit the root, and allowing a filling of amalgam to extend from within the root through the cylinder; using a composition pin to strengthen the attachment.

Gold crowns can be adjusted in the same manner as the porcelain crowns, and a beautiful operation can be made, the amalgam being entirely hidden from view. A crown of this description is made by taking a ribbon of coin gold, number twenty-eight American gauge, and forming it into a cylinder shaped at one end to fit closely the root. An articulating face is made by taking a piece of gold plate, wider than the diameter of the cylinder, and placing upon it small, square pieces of gold, making pyramids according to the number of cusps required. The plate is held in the flame of a blowpipe, to solder the pieces together and to the plate, using an eighteen-carat solder. Now flow a solder of a lower carat upon the opposite side of the plate, place the cylinder upon it, and again hold in the flame until the solder reflows. The excess of gold is cut off, the cusps filed to their proper shape, the crown polished and filled with a plastic.

After the plastic has become hard, concave the base, drill the number of holes needed through the crown to its articulating face, and countersink the holes. The crown is now ready to be attached to the root. If, when adjusting the crown, any difficulty is experienced on account of the pins not adapting themselves, the holes can be made larger with a bur. After the crown is adjusted, the amalgam on the articulating face can be cut away and gold filled in its place, making to appearance an all-gold crown.

If a root be even with the gum, the gold can be made to encircle it. This is done in a very accurate and quick manner, by placing a soft steel wire, No. 27, around the root, and twisting the ends together until tight; then, burnishing the wire into the irregularities of the surface of the root, removing it and placing it on a block of soft but

tough wood, and striking it with a flat hammer. You now have the exact counterpart of that portion of the root you wish to place the gold around. Gold crowns made and adjusted in this manner require about two hours' time, and necessitate but one appointment with the patient.

In presenting to you in the crude manner that I have to-night the subject of artificial crowns, I do not wish to convey the idea that any part of what I have described is original. I have only selected from different methods, as advanced by others, that which will meet the demands as they are presented by individual cases in practice.

Discussion.

Dr. E. H. Neall. I think that in the majority of cases it will be found to be true that the more readily the crown can be adapted the greater will be its usefulness. I strongly object to the great waste of tooth-bone that is made necessary by the use of many of the recent methods. For this reason I have used a great number of Logan crowns, which, after roughening the platinum pin, I attach with gutta-percha or oxyphosphate. I also use the Bonwill crown, but give the preference to the "Logan," as it can be used without amalgam. In setting crowns, I do not usually trim the root down close to the margin of the gum, unless from the nature of the case the line of union between the root and crown will be very perceptible. When preparing to attach an all-gold crown, I take a cast of the corresponding tooth on the opposite side of the mouth; then after slight trimming make a metal die, and from this strike up the whole crown, which I make of foil-scraps melted up and rolled out to about No. 25 of the standard gauge. These all-gold crowns I have found very useful where the root is badly broken. A platinum pin is first cemented in the root, and the crown attached to pin and root by oxyphosphate.

Dr. Register. Has anyone present had any experience in making crowns by Matteson's method?

Dr. Darby. I do not think this method is generally used, though the results obtained from it in Dr. Matteson's hands show that it is a very good one. The Logan crown has this advantage, that the pin is burned in the porcelain; but the pin itself seems to be too small. It would be better, also, if it were not square. A platinum pin is easily stretched away from the porcelain in setting. With regard to the best material for attaching crowns to roots, my experience with amalgam more and more disinclines me to use it for that purpose. I prefer phosphate of zinc. All the pins set with amalgam which I have observed have given way. The amalgam seemed to rot them.

President Guilford. The Matteson crown is so formed in the stamping or pressing that it needs but little fitting to the root. After the crown is placed in position, its shell is nearly filled with amalgam or phosphate of zinc, which thus also surrounds and clings to the projecting root wire. A porcelain face is then ground to fit the labial opening in the crown, and dove-tailed on both sides and the cutting edge. This is then cemented in place, completing the work. The opposing tooth does not touch the porcelain, but only the gold shell.

Dr. Tees. My principal objection to the Logan crown is the difficulty of inserting the pin in the root, when gutta-percha is used, and this I consider the best substance for the purpose. By this method the pin and tooth must be heated, and that will cause discomfort to the patient. It is almost impossible to work oxyphosphate satisfactorily. If it is mixed too thin it will not harden well, and if too thick it will crumble. I think that with the Bonwill crowns made properly the profession would want nothing else; but they should not be set with amalgam. The pin which I have been using with most satisfaction is made from a piece of silver plate, No. 22, about one-sixteenth of an inch wide. I fill the root with gutta-percha, and then warm the pin and place it in position. Then the crown is filled with oxyphosphate and pressed to place. When I cannot procure a Bonwill crown to suit, I use an old-fashioned pivot tooth.

Dr. Leech. I have had my best successes lately with the Bonwill crown. The failures I formerly encountered with it were, I think, in a measure my own fault. My greatest fault had been in using the amalgam too stiff. If you get the crown nicely adapted to the root, there will be no rocking,—an important gain, and one which will have very much to do with the final success of the operation. The labial portion of the crown should be carried as far under the gum as possible. The amalgam should be mixed rather soft; put some in the root; run an instrument up first, and then the pin, and see that it is firmly secured. Now try the crown on, and see if it is correct. Then put in more amalgam, packing it well in the root and around the pin; put some amalgam in the crown and push it well to place; and, finally, caution the patient to be careful of the tooth for a while, until the amalgam is firmly set. Proceeding in this way, you will find that the operation is permanent. As Dr. Darby has remarked, the amalgam will eat the pin off; but if you have a good adaptation, so that the crown will not rock on the root, you need not mind that; the amalgam itself will hold the crown in position. Do not have the amalgam too stiff in adjusting the crown. If it is too stiff the amalgam in the root and the amalgam in the

crown will not join, but there will be a line of demarkation, and you will have nothing but the pin to depend on; but if the amalgam is mixed soft, and carefully worked up in the canal, so that there is one solid mass of amalgam in the root and in the crown, you will have a firm piece of work, even if the pin does give out.

Dr. Register. I have had poor success in setting the Bonwill crowns. One great error in setting crowns is generally committed in the initiatory steps. As a rule the root is not properly dried. Probably only a small minority of operators use hot air to dry the cavity; a precaution which, in my opinion, would go far towards insuring success. If, because of failure to thoroughly dry the cavity, we have a space between the root and the material for setting the crown, decay will follow, when, if the moisture had been dried from the devitalized wall, a hermetical joint could have been made. In one of the most successful operations I have ever performed the crown was put on originally as a temporary expedient. It was done in a hurry, about twelve years ago, for a lady who was preparing to take a European trip. The tooth was a labial incisor, and a small one at that, which had been broken off by a fall from a carriage. I took out the pulp, selected a thin plate tooth of proper size and color, and a narrow piece of platinum, and riveted them together; and with a pair of pliers gave a twist to the backing; no solder was used. The root was dried out thoroughly *with hot air*, and the crown set with oxychloride (there was no oxyphosphate in those days). The backing was then cut away on the palatal surface, and filled in with gutta-percha, and the patient dismissed. After her return, I tried on three different occasions, without success, to get the tooth out, in order to make a permanent operation. About two years ago I filled it permanently at the back with amalgam. The success of this operation has caused me to set several crowns in a similar manner. A better post is made by having threads cut in two directions, right and left, on the pin; it gives the appearance of many points on the surface. I use on the marginal surface, before setting the crown, gutta-percha collodion, flowing a thin film of the preparation over the walls. This I also use over sensitive dentine, for the purpose of insulating fillings of metal; a film of the gutta-percha collodion, flowed over the cavity, prevents all thermal irritation, and renders the after-service much more comfortable. The film formed by the use of the gutta-percha collodion is due to the evaporation of the chloroform contained in the preparation. You can apply cold air to sensitive dentine treated with this preparation without discomfort. Of course, to make a positive union, the dentine must be dry; this can be positively done in a devitalized tooth, while in the living dentine it should be

brought as near to that point as possible, without risk of destroying the fibrillæ.

Dr. Wood. I found that most of my failures in setting crowns with gutta-percha resulted from the pin being too small in proportion to the canal. I now use as large a pin as will allow for the necessary amount of gutta-percha to hold it. Before taking the impression I fit a piece of the pivot-wood into the root, as a gauge, so that when the impression is removed the pivot comes away as part of it; and when the cast is made the pivot is withdrawn from the cast, giving the exact size and angle of the canal in the root. When practicable, I sometimes plug the apical foramen with pivot-wood; I take a stick of prepared wood and taper it so as to closely fit the extremity of the canal, leaving it free of the walls in the larger part of the canal, to facilitate its removal, should that be necessary. After dipping the point in creasote I force it to place—having previously cut it at the proper distance—and twist the butt end off, so as not to interfere with the metal pin of the crown.

Dr. Essig. Fifteen years ago I used gutta-percha exclusively in setting pivot teeth, with good results as a rule, although occasional failure occurred, in consequence of the gutta-percha being overheated in setting the tooth. The variable quality of the gutta-percha furnished by dealers will also prevent uniform results in its use. I have, therefore, long since abandoned it for oxyphosphate of zinc, which requires neither force nor heat in its application; and is, therefore, less likely to incite periostitis. It is inferior to gutta-percha only in the difficulty of removing the pin, when the porcelain tooth is broken away, necessitating the use of a fine fissure-drill to cut away the cement from around the gold or platinum wire in order to obtain access to the canal.

Dr. Bonwill. Dr. Leech formerly laid his failures to the crown; now he attributes them to the manner in which he placed them upon the root. I am satisfied that the principle of setting the all-porcelain crown on the nut-and-bolt plan was perfectly correct; and that any one versed in mechanical principles would affirm its correctness. I have met men who had failed to get satisfactory results with these crowns, and on investigation found that they had not even read the directions, and had ignored the little details which go to make up success. I consider it foolish to attempt to adjust a crown with a pin fused in it. The method of mounting crowns described by Dr. Register is not new. Dr. How has done the same thing with his crown. I believe in amalgam, but I defy any man to pack it in the manner described by Dr. Register and Dr. How, so as to be cleanly. It will discolor. Not one dentist in five hundred can, with a tap, cut a perfect thread in wet dentine. In the matter of setting

crowns you have got to come back to the principle which I have elaborated. They are the same that guide the engineer in his work. I have made crowns of amalgam in a few cases, where the teeth were quite short,—of course in the back part of the mouth,—and the amalgam has remained bright. Some failures have occurred in setting the all-porcelain crowns, because the crowns were not made by the manufacturers according to directions. With regard to the objection against amalgam urged by Dr. Darby, I would say that the pins were not "rotted" by the amalgam; I have tested that point thoroughly. It was foolish to put out three sizes of pins in the first place for setting the crowns; purchasers always got the smallest size, and of course they had failures.

Dr. Register. I think Dr. Bonwill is not consistent with regard to amalgam. Why does he make crowns of it, if it discolors?

Dr. Bonwill. If it is put in contact with another metal, it will discolor. When it is used for crowns, no other metal should be in contact with it.

IOWA STATE DENTAL SOCIETY.

The twenty-third annual meeting of the Iowa State Dental Society was held in Des Moines, commencing Tuesday, May 5, 1885, the sessions continuing four days. The attendance was the largest the society ever had. The papers, discussions, and clinics were very interesting and instructive. The membership was increased by twenty-seven. The officers elected are as follows: A. Morsman, president; R. L. Cochran, vice-president; J. B. Monfort, secretary; J. S. Kulp, treasurer.

The transactions of this meeting will be published in full in pamphlet form. The society adjourned to meet in Iowa City on the first Tuesday of May, 1886.

J. B. Monfort, *Secretary*, Fairfield, Iowa.

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

The fifteenth annual meeting of the South Carolina State Dental Association was held in Columbia, S. C., June 2 to 4, 1885.

The following officers were elected to serve for the ensuing year: A. P. Johnstone, president; R. C. Young, first vice-president; J. M. Quattlebaum, second vice-president; Theo. Johnstone, corresponding secretary; R. Atmar Smith, recording secretary; L. S. Wolfe, treasurer. Dr. J. T. Calvert was elected to fill the vacancy in the board of examiners.

The next meeting will be held in Columbia, on the first Tuesday in June, 1886.

R. Atmar Smith, *Rec. Sec.*, Charleston, S. C.

GEORGIA STATE DENTAL SOCIETY.

THE seventeenth annual meeting of the Georgia State Dental Society was held in the city of Savannah, Ga., May 12 to 16, 1885.

The following officers were elected for the ensuing year: J. H. Coyle, president; J. P. Holmes, first vice-president; C. T. Osborn, second vice-president; L. D. Carpenter, corresponding secretary; W. L. Smith, recording secretary; H. A. Lowrance, treasurer. Executive Committee and Examining Board for two years: S. B. Barfield, chairman; L. D. Carpenter, secretary; R. B. Adair, G. W. H. Whitaker, and N. A. Williams.

The next meeting will be held at Macon, in May, 1886.

L. D. CARPENTER, *Corresponding Secretary*,
Atlanta, Ga.

AMERICAN DENTAL ASSOCIATION.

THE twenty-fifth annual meeting of the American Dental Association will be held at Minneapolis, Minn., commencing Tuesday, August 4, 1885.

The present prospects are that the meeting will be an unusually large one.

Railroad fares have been secured at unprecedentedly low rates. Tickets for the round trip from New York to Minneapolis and return will be furnished for $24.00; round trip from New York to Chicago and return, $18.00; round trip from Chicago to Minneapolis and return, $6.00. At present it will be necessary for those wishing these tickets to secure them in Chicago. Later we may be able to make arrangements by which they can be obtained at different points east. By sending a check for tickets to the chairman of the Committee of Arrangements the tickets will be promptly forwarded. Negotiations are pending for rates from other points that the committee anticipate will accommodate all, and more definite information will be given in later journals and also in a circular sent to every member.

The hotel rates will be as follows: West Hotel, $4.00 per day; Nicollet House, $3.00 per day; National Hotel, $2.00 per day.

It is hoped that members having new facts or ideas in regard to theory or practice will come prepared to present them in connection with the section work. Any one having anything new in the way of appliances will be given an opportunity to demonstrate their use during the half day that will be devoted to clinics.

ATTRACTIONS AND EXCURSIONS.

Come equipped with guns and fishing tackle. While the interest and benefit of the meetings, the attractions of the trip, and the

beautiful city where we meet are too well known to need special mention, it may not occur to all that they will find themselves, in Minnesota, in one of the finest of hunting and fishing countries. Minnesota is especially famous for its prairie-chicken and grouse shooting, and its fine fishing grounds. It is estimated that there are not less than 10,000 lakes dotting the State. If one wishes a still greater variety of scenery, to see a new, wild and picturesque country, to draw out the big brook trout, the black bass, and the mighty muskallonge from the cold waters of the Lake Superior region,—in fact, to enjoy the finest fresh-water fishing in the world,—a round trip ticket from Chicago to Ashland and return will be furnished them for $10.00.

A still greater attraction (if one more were needed) is offered in the shape of a ten days' excursion to the far-famed "Yellowstone National Park," immediately upon the close of the Association meetings, provided a sufficient number send in their names to warrant the securing of special cars and special rates. The committee believe that, when so far on the way as Minneapolis, many will wish to avail themselves of this opportunity for seeing the grandest scenery in the world. The entire expense for the round trip from Minneapolis, including rail transportation, Pullman sleeping-car fares, meals on the Northern Pacific dining cars, hotel accommodations, five days in the Park, and stage transportation, will be $120.00.

A circular describing the magnificent scenery in full will be sent to every member of the American Dental Association at an early day. Others than members who may contemplate going will receive the same by making application for it. Come one, come all, and bring your wives along. It will be a trip that ladies will especially enjoy. Those wishing to go to Yellowstone Park will please send in their names at an early day, so that all arrangements may be speedily and satisfactorily completed. For further information, address

J. N. Crouse, *Chairman Committee of Arrangements*,
2101 Michigan avenue, Chicago.

NEW JERSEY STATE DENTAL SOCIETY.

The fifteenth annual meeting of the New Jersey State Dental Society will be held at the Coleman House, Asbury Park, commencing Wednesday, July 15, 1885, the sessions continuing for three days.

Every effort has been made to make this particular meeting more memorable and enjoyable than any heretofore held. Interesting papers have been promised from the most eminent in the profession, and the society membership have also contributed liberally. The

clinics to be held will be made an important feature, and considerable time and attention has been given towards an exhibition of new and important surgical and mechanical appliances for use in dentistry. It is in contemplation to give a grand reception to the visiting members of the profession, on one evening to be arranged for. The place is easy of access; the cuisine the best, at $2.50 per day; the location superb, within fifty feet of the surf. The hall for the session is attached to the hotel; commodious and cool. Come and meet with us.

Chas. A. Meeker, D.D.S., *Secretary*,
27 Fulton street, Newark, N. J.

MISSOURI STATE DENTAL ASSOCIATION.

The twenty-first annual meeting of the Missouri State Dental Association will be held at Sweet Springs, commencing Tuesday, July 7, 1885.

J. D. Patterson, *Chairman Executive Committee*,
Kansas City, Mo.

MISSISSIPPI DENTAL ASSOCIATION.

The annual meeting of the Mississippi Dental Association will be held in Jackson, Miss., commencing Tuesday, August 4, 1885, the sessions to be continued for three days.

The State Board of Dental Examiners will meet at the same time and place.

Reduced rates will be obtained from railroads and hotels. Arrangements have been made for clinics, and the meeting promises to be one of unusual interest.

W. W. Westmoreland, *Corresponding Secretary*,
Columbus, Miss.

PENNSYLVANIA STATE DENTAL SOCIETY.

The seventeenth annual meeting of the Pennsylvania State Dental Society will convene at Cresson Springs, Pa., Tuesday, July 28, 1885, at 10 A. M., its sessions continuing for three days.

Rates at the Mountain House have been reduced from $4.00 to $3.00 per day to delegates and their families, dating from Saturday, July 25, and continuing as long as desired. Orders for *special* excursion tickets will be issued over all lines of the Pennsylvania and A. V. R. R. Usual excursion rates over other roads. Orders or general information can be obtained by addressing

W. H. Fundenberg, *Corresponding Secretary*,
958 Penn avenue, Pittsburg, Pa.

WISCONSIN STATE DENTAL SOCIETY AND EXAMINING BOARD.

THE fifteenth annual meeting of the Wisconsin State Dental Society will be held at La Crosse, July 28 to 31, 1885. All members of the profession are cordially invited to be present.

C. A. SMITH, *Chairman Ex. Com.*, La Crosse, Wis.

The next regular meeting of the Wisconsin State Dental Examining Board will be held at La Crosse, on Tuesday, July 28, 1885, during the sessions of the State Dental Society.

C. C. CHITTENDEN, *President.*
EDGAR PALMER, *Secretary.*

CORRECTION.

TO THE EDITOR OF THE DENTAL COSMOS:

SIR:—In the May number of the DENTAL COSMOS, page 282, your reporter makes me say, "The dried skeleton weighs six pounds, of which one-third is lime." I tried to say something over six pounds, of which one-third is *phospate* of lime.

Again, "Rice, which is one of the poorest foods in lime-salts, contains $1\frac{6}{10}$ per cent. lime-salts. A man who consumes two pounds of rice per day gets in a year about three pounds of lime." I said that rice contains about nine-tenths of one per cent. of mineral matter (not lime-salts). I am not responsible for the arithmetic in this clause either. Please correct and oblige,

W. H. MORGAN.

NASHVILLE, Tenn., MAY 16, 1885.

EDITORIAL.

OVERPLUS OF MATTER.

THIS issue of the DENTAL COSMOS is largely taken up with reports of dental societies. The papers and discussions are, however, well worthy of publication. The discussions have been considerably abbreviated, but have still been afforded more than usual space because of their practical value. This has compelled the laying over of important communications, for which we must ask the indulgence of contributors.

MINNESOTA DENTAL LAW—CORRECTION.

WE are requested to state that the name of S. T. Clements, L.D.S., Faribault, Minn., instead of J. I. Clements, D.D.S., should have been given as president of the Board of Examiners appointed by the Governor under the Minnesota dental law, as printed on page 380 of our June number.

BIBLIOGRAPHICAL.

URINARY AND RENAL DERANGEMENTS AND CALCULOUS DISORDERS. Hints on Diagnosis and Treatment. By LIONEL S. BEALE, M.D. Small octavo, pp. 356. Philadelphia: P. Blakiston, Son & Co., 1885. Price, cloth, $1.75.

The topics suggested by the title of this unusually compact and comprehensive work are taken up and treated in a systematic and orderly manner. One can but wonder that any fairly satisfactory presentation of the many sub-divisions of the subject could be made within the compass of a book of this size, and yet we think the discussion of the various lesions will be found not only terse, but full enough for the practical guidance of the practioner. It cannot be read but with profit by student or physician.

OBITUARY.

ELLERSLIE WALLACE, M. D.

At a special meeting of the corporators of the Pennsylvania College of Dental Surgery, held March 20, 1885, resolutions were adopted in reference to the death of their fellow member, Dr. Ellerslie Wallace; expressing appreciation of his helpful, manly co-operation in the work of dental advancement, respect for his memory and character, and tendering sympathy and condolence to the family, to whom a copy of the resolutions was ordered to be transmitted.

HINTS AND QUERIES.

AN EXHAUST SYRINGE.—This age is prolific in the production of means and appliances for facilitating operations in dental surgery, and it is not an infrequent occurence that such devices are found to be of general utility when conceived after a thoughtful consideration of the pathognomonic principles involved in lesions that come within the purview of the general practitioner. An instance of this kind is observable in the recent and ingenious devices of a young dentist, Dr. R. Walter Starr, of Philadelphia, whose apparatus is here described and illustrated with reference to its special employment in the treatment of alveolar abscess. In ordinary practice it is usual to inject medicaments through the pulp canal into the abscess sac, and thence by its sinus into the oral cavity, and as such therapeutical agents are commonly of an escharotic nature, the parts adjacent to the fistulous opening are more or less excoriated by the overflowing fluid,—an undesirable result, which the new method almost wholly prevents.

Number 1 shows a small glass cylinder, having its reduced portion bent at an acute angle, and terminating in a thin platinum pipe which has the glass tube fused upon it. This vessel is designed for use in the superior teeth.

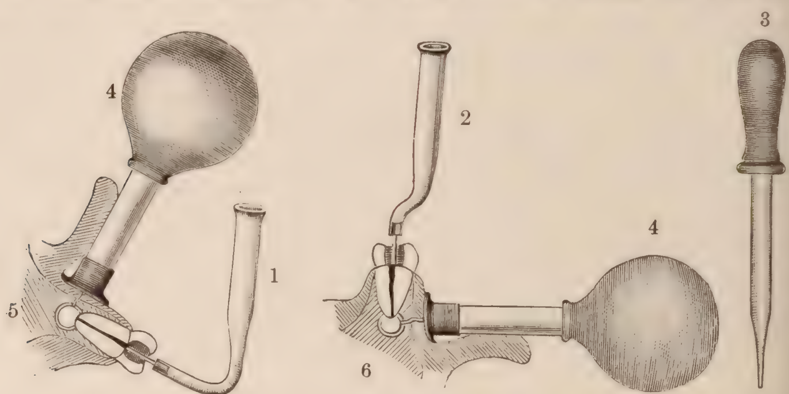
Number 2 exhibits a similar vessel having a bayonet-shaped pipe, and is intended for use in the inferior teeth.

Number 3 is a common glass dropper with its compressible rubber bulb.

Number 4 illustrates what may be not inaptly termed an artificial leech, and it consists of a compressible rubber bulb, fixed on a hollow cylinder of glass, which has on its other end a rubber collet, terminating in a very thin annular flange. By compressing the bulb, placing the flange on a flat, smooth surface, and then releasing the bulb from pressure, it will be found that through atmospheric pressure on the flange considerable force will be required to detach the leech from the surface; and this capability of being made to produce suction constitutes the operative function of the simple device.

Number 5 shows a vertical section of the soft parts, alveolus, and maxilla, contiguous to a carious superior bicuspid, which by the putrescence of its dead pulp has occasioned the abscess that, with its sinus, is also shown in the sectional view; and with reference to this figure, the method of using the apparatus will now be described, it being assumed that the carious cavity has been properly prepared.

The platinum pipe of the vessel (1) is first to be surrounded with gutta-percha, softened by heat; the pipe immediately inserted in the mouth of the pulp canal, and the gutta-percha packed into the cavity around the pipe, which, upon the



subsequent cooling of the packing, will thus be firmly and hermetically held in place. The proper quantity of a suitable fluid medicament is then taken up in the dropper (3), and discharged into the vessel (1); and after compressing the bulb of the leech, its flanged mouth is placed over the fistulous opening, pressure gradually removed from the bulb, and the fluid visibly drawn from the vessel (1) through the pulp canal into the sac, and out from the sinus into the leech cylinder, which, with its contents, may then be readily removed from the gum by a simultaneous depression of and slight pressure upon the bulb; so that but a very little overflow from the sinus will be perceptible. A little practice will enable the operator to so nearly exhaust the fluid from the vessel (1) and the pulp canal that, upon the removal of the pipe after softening the gutta-percha with a warm plugger, there will be but a slight extravasation of the fluid from the crown cavity, which may then be sealed to await a repetition of the operation, if that shall be found necessary. It is, however, by many dentists deemed the best practice in such cases to at once and permanently fill the pulp canal and crown cavity.

The exhaustive action of the artificial leech is designed to promote the collapse of the sac walls, in contradistinction to the distending effects of the common force-pump process, and may presumably hasten the obliteration of the sac.

Number 6 is a like sectional view of a similar lesion in the inferior maxilla, and

in this instance the adaptation of the vessel (2) to the inferior molar is made apparent by the cut without further description ; yet in such cases gravitation assists the action of the leech and renders a slightly modified manipulation requisite, in so detaching the leech as to prevent excessive outflow from the sinus.

The correlative applications of this leech will suggest themselves to appreciative dentists and surgeons, but it may be well to indicate its adaptation to the facile and cleanly evacuation of a large class of cavities having fistulous openings, and it may also be used in local blood-letting, as a substitute for or adjunct to the repulsive and troublesome *hirudo medicinalis.*

To the Editor of the Dental Cosmos:

Dear Sir: Referring to the report of the meeting of the New York Odontological Society, published in the Dental Cosmos for April, 1885, I would like to discuss a few points which time did not permit of at the meeting.

Dr. Clowes thinks that the tincture of the chloride of iron is the most ruthless tiger concerned in the destruction of human teeth. I am convinced that millions of people whose teeth show the ravages of decay never have suffered from that particular tiger. Decayed teeth are found in almost every Indian skull yet discovered. Is it supposable that those Indians used the horrible *tinctura ferri chloridi?* Moreover, this tincture is prescribed extensively only in English countries, and yet the teeth of the French and Germans show nearly as much decay as those of the English people. It cannot be denied that the tincture of iron may do harm, but to generalize from exceptional cases does not seem quite admissible. Is it not a fact that generally tincture of iron is prescribed by physicians in cases of "broken down" constitution, and is it not often given to an extent which produces gastritis and the eructation of acid fluids into the mouth and into contact with the teeth? Here is a combination of circumstances favorable to the beginning of caries. The erosion of a tooth by an acid prepares the way for the beginning of decay. It is admitted that chloride of iron, allowed to come freely and frequently into contact with teeth, will injure them seriously, as would any other strong acid; but the effect produced is not caries,—a burn is not a papula.

Dr. Thomson's remarks showed that he was in a state of uncertainty about matters which we presumed had been pretty well settled. The subject of fermentation by yeast has been investigated as extensively, perhaps, as any subject in physiology. The doctor asked, "How can fermentation produce bacteria (!) termo when alcohol destroys or arrests the further development of all life that may be immersed therein?" Fermentation never was claimed to produce bacterium termo, which follows but is not produced by it. The alcohol produced by fermentation is not of greater strength than from 10° to 20°,—not sufficient to "destroy further development of life." The question would have been pertinent if fermentation produced absolute alcohol, or if any one had claimed that fermentation produced bacterium termo.

Dr. Dwinelle is not ready to give up the acid theory easily. However much capillary attraction may be considered able to distribute the fluids throughout the entire animal economy, yet the action of vinegar, for instance, is quick enough to dissolve a certain amount of tooth-substance before it has been rendered harmless by distribution. But dissolving is not decay. The acids which creep into the cavities of the human body do not come there through capillary action, but are carried there by the circulation. A very interesting observation—and certainly not without foundation—was made by Dr. Dwinelle, viz., that iodide of potassium has the effect of grooving teeth at the cervical borders. This is analogous with

its effect upon certain glands; but such grooving is certainly not decay. Dr. Dwinelle seemed to think that this peculiar grooving of teeth had been and could be brought about by artificial means, which, with all due respect to chemistry and Dr. Dwinelle, we doubt. We can cut a groove into a tooth with an emery wheel, but, so long as nature does not use such means, such a groove proves nothing.

Dr. Bogue, while recognizing cleanliness as an important factor in the prevention of decay, tried (it seemed to me quite unnecessarily) to make a point that my conclusions are not based so much on practical information as on chemical theory. It is true that every gentleman present at the meeting knew probably many times more about practical dental matters than I do, but when they discuss and explain cases from the stand-point of chemical science, our positions become more nearly equal. Granting that Dr. Dwinelle, or any other member of the society, may be a hundred times my superior in practical dentistry, yet when, in generalizing, he enters the domain of another science, he can no longer rely upon his dental experience for the support of his theories. Thus, if one of these gentlemen should state that decay is produced by the action of nitric acid from the oxidation of ammonia, even though his knowledge of chemistry were at least equal to mine, I could with propriety reply that, having made many experiments, I had reason to believe that such action was not possible,—in other words, admitting my ignorance of dentistry, I may at least discuss chemical principles with dentists.

Dr. Bogue could hardly credit his ears that I said "bugs are always first." He said the same thing himself, though he did not realize that he was saying it. He said, "They will do no harm to the tooth until the enamel shall have been penetrated by chemical action, which chemical action is probably *fermentative*." What is fermentation? Does it not necessarily presuppose and require bugs? No fermentation can take place without micro-organisms, vulgarly called "bugs." Dr. Bogue acknowledges that one class of bugs must be there before another class can do any mischief,—exactly as I put it, "bugs are always first." It is true that I did not specify what kind of bugs, but I meant to include all the fermentative micro-organisms, as well as the bacterium termo, under this appellation. This is the practical point in the theory and treatment of decay. If the bugs are there first, we have to treat differently than if acids were there first. If micro-organisms are the first cause, carbolic acid, bichloride of mercury, eucalyptol, etc., are the proper remedies. If the acids are there first, such remedies are worthless, and soda, chalk, or some similar base, is indicated. The practical dentist (Dr. Bogue), not the theoretical chemist, has long ago decided this question in his own practice. By using the first-mentioned remedies, he shows his belief in the theory, "bugs" first.—Chas. Mayr.

To the Editor of the Dental Cosmos:

Dr. E. C. Koons, of Sheridan, Wyoming, visited the Custer battle-field in August last, and found protruding from the soil a part of the superior and the entire inferior maxillary bones, with the teeth in place. They are now in his possession. While in Sheridan I examined them, and send you a description, with the idea that the dentist who did the work would be likely to read the article, and could in this way identify the officer or soldier Dr. Koons marked the spot. It was within a few feet of where Custer himself fell. The entire cutting surface of the right superior central, the anterior surface of the left superior lateral, and the posterior surface of the right superior cuspid are filled with gold; the inferior first and second molars on the right side are missing; the dens sapientiæ on the right side is filled with amalgam. The person was about thirty-five to forty years old; lower jaw rather broad and angular.—Thomas F. Coryell, *Dayton, Wyoming.*

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

CONCERNING SEPARATORS.

BY SAFFORD G. PERRY, D.D.S., NEW YORK, N. Y.

The advantages to be derived from a device by which the teeth, without previous wedging, can be drawn apart and held in position while operations are made upon their approximal surfaces are so great that it seems unnecessary to call the attention of the profession to them.

To the dentist whose practice is that of heedlessly making permanent separations between the teeth, with no thought of the safety and comfort of the gum or of the future change of position of the teeth, such a device may be of but little value. But to the one who, in making permanent separations, endeavors to leave a point of contact to protect the gum, and hold the teeth in position, or to the one who makes strict restorations of contour, it is a device of the greatest value.

The Jarvis separators, brought out in 1875, demonstrated the fact that by means of the screw most of the teeth could be somewhat separated, and that it was an operation which could be performed safely and with no more pain than would be willingly borne by most patients. But the usefulness of these separators was greatly lessened by the fact that when in position they were in the way, and prevented approach to the surfaces they were intended to expose.

Appreciating the advantage which must arise from a separator which would open and retain the teeth, and at the same time be so constructed as to be out of the way, I devised the separator which is shown in Fig. 1. [It holds in place a matrix which will be described later.] This separator I exhibited at the annual meeting of the Dental Society of the State of New York, held at Albany, in May, 1877. In a paper on the "Treatment of the Approximal Surfaces of the Bicuspids and Molars," read at that meeting,

and published in the Dental Cosmos for May, 1879, I advocated the restoration of the shapes of the teeth, and exhibited this device as one of the aids to such practice. At the request of one of the agents of the late Dr. S. S. White, this separator, which was adapted to the bicuspids and cuspids only, was put into his hands with a view of completing the patterns for a set of separators adapted to the shapes of the different teeth. In due time it was returned to me with an abstract of the Jarvis patent and the statement that the improvement was undoubtedly covered by the Jarvis claim, and as the Jarvis separators were in the hands of the Johnston Bros., and being manufactured by them, it did not seem advisable to complete the set of patterns and undertake the manufacture of the separators. A year or two later the Johnston Bros., from a pattern which I gave them, made and sold to the profession the separator shown in Fig. 2. [This also holds in position a half matrix, which will be described later.] In this separator an effort was made to

Fig. 1.

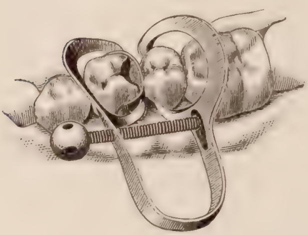
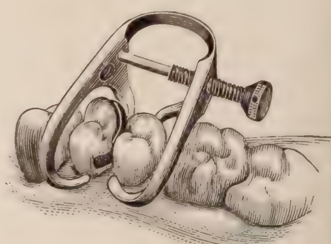


Fig. 2.



employ adjusting screws set in the inner jaws of the separators, and not shown in the cut, which should better fit them to teeth of different sizes and position; but, owing to some inadvertence, they were not submitted to me for revision and approval before being finished and put on the market, and, not being rightly made, they proved to be somewhat disappointing, and I believe but few of them were ever sold.

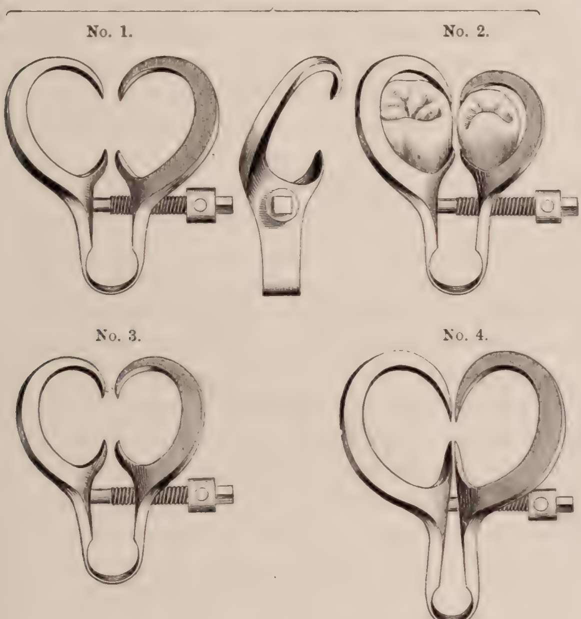
After a thorough trial of this separator it became evident to me that the adjusting screws would not accomplish the object expected of them, and that the only way to meet the requirements of teeth of different size and shape would be to return to the plan of the original separator, and make a set which should contain one for the front teeth, one for the bicuspids, one for the molars, and perhaps one for the molars and bicuspids.

Patterns, therefore, for these four, which had been commenced in 1877 and 1878, were worked upon from time to time, but were not completed until November, 1883, at which time they were put into the hands of The S. S. White Dental Manufacturing Co., who had

in the meantime come into possession of the Jarvis patents. A set of separators made from these patterns is shown by the accompanying cuts. (Fig. 3.)

They were finished and sent by The S. S. White Dental Manufacturing Co. to be exhibited at the meeting of the American Dental Association, at Saratoga, in August, 1884; but they were not shown there, as I was not present to explain their use. They were subsequently exhibited at the October meeting of the New York Odontological Society, and a description of them published in the Dental Cosmos for January, 1885. As will be seen by the cuts, the general

Fig. 3.



plan of the original separator was followed in completing the patterns for the full set. The shanks were turned down in the same manner, for the purpose of getting them out of the way, and to allow the screw to be placed nearly on a line with the points of bearing of the jaws. The shanks were somewhat shortened to allow their use far back in the mouth without interference from the cheek when used on the outside, or from the tongue when used on the inside, of the mouth. Except in the case of the one adapted to the incisors, the bows were made only large enough to go over the largest teeth that might be met with. They were kept as small as possible, in order to be out of the way in working over them, and to lessen the danger of disturbance or displacement. In the one de-

signed for the incisors the size of the bow was increased beyond the need which might be apparent at first sight. This was done for the purpose of allowing the shank to be used on the outside or the inside of the arch. It seemed desirable to be able to use the separator with the shank and screw on the opposite side from which the approximal surfaces were to be approached. As the upper and lower incisors almost invariably point forward, and as the attachment of the gums is farther from the cutting ends on the outside than on the inside, it will be readily seen that in order to reverse the shank the bow must be enlarged. In other words, a small-bowed, close-fitting separator, which could be most conveniently used with the shank on the outside of the arch, could not be used at all with the shank on the inside, for the small bow would almost invariably strike the ends of the teeth when the separator was thus reversed. I therefore enlarged the bow of this separator so that it could be reversed, even at the risk of the bows being in the way, and of its being more easily disturbed or displaced. As I expected it to be generally used with the screw and shank on the opposite side from which the approximal surfaces were approached, I brought the sides of the shank close together to better fit it for the narrow circle made by the curve of the inside of the arch. At the suggestion of Dr. Wm. Jarvie, I added the watch-key device for turning the screws, and it has proven a great convenience in operating the separators.

Before the pattern for this separator was finished I had seen in the possession of Dr. C. L. Brown, who occupied an office in my house, a separator which he had copied from a modification of one of my original separators, which had been made by Dr. Bogue. This modification consisted in greatly enlarged bows, by which the separator could be applied over a larger number of teeth, and by which means it became more nearly a universal separator than any I had yet seen or made.

In describing my separators before the Odontological Society I failed to mention that I had seen this separator, and as I had no knowledge whatever that Dr. Bogue had made any further efforts to make separators of this class useful, I did not mention his name in connection with them. My failure to mention having seen this large-bowed separator was quite natural, however, as there was but slight resemblance between my finished incisor separator and the one I had seen in Dr. Brown's possession. I have since learned that Dr. Bogue, taking up the separator shown in Fig. 2, has increased the size of the bows and made a set of separators which can be used over most of the teeth.

I soon became dissatisfied with the working of this reversible

incisor separator, and requested The S. S. White Dental Manufacturing Co. to stop its manufacture until I could get the time to correct its defects. I determined to abandon the idea of making it reversible, and decided to return to the old plan of my first separator. I saw that the shank could always be used on the outside of both the upper and lower incisors, if the bars of the shank were only set wide apart, so as to give access to the approximal surfaces from the front side of the teeth. This would allow the bows to be so reduced in size as to fit close to the teeth, and therefore to allow the operator to get close to his work and be in less danger of disturbing the separators by such pressure upon the bows as is almost unavoidable in working over them. Of course the larger the bows the greater the leverage when pressure is brought upon them, and consequently the greater the danger of disturbance. The reduction of the size of the bows and the setting wide apart of the bars of the shank was easily accomplished, and the result was a separator which in every respect was an improvement over the one I exhibited before the New York Odontological Society. There still remained one defect, however, which I saw must be remedied. It consisted in the obstruction caused by the presence of the screw, which still somewhat prevented free access to the approximal surfaces from the front side of the teeth, and interfered with the use of the emery-tape and sand-paper disk in finishing. I therefore remodeled the separator again, placing the screw somewhat below the points of bearing of the jaws, and turning the shank down so that it and the screw were below the line of the emery-tape when it was passed at right angles between the teeth. This gave unobstructed access to the teeth from either side. A few days' use even of this separator convinced me that it was a very marked improvement over any form of separator I had yet made,—in fact, that it was about as nearly perfect as I could ever reasonably expect a separator of this class to be made. I found that it had ample power, and that it could be applied wherever the first one could be used, and in some places where the first one could not. This separator is shown in Fig. 4. I became so impressed with the advantage of this change that I determined to remodel the whole set on this general plan.

The result is shown by Fig. 5, which represents the separator designed for the bicuspids and for the bicuspids and cuspids. It seems unnecessary to illustrate the other two of the set, as they are made on the same plan. The working of these separators in actual practice demonstrated the fact that I had made a very important improvement in them. Yet there were still some defects. Although the shank was thrown down out of the way, yet it was still sometimes an obstruction. Another fault was the unmechanical applica-

tion of the force of the screw, and the uneven movement of the jaws. Opening like a pair of pliers, the outside jaws traveled more rapidly than the ones nearest the screw, and being unsupported they were less steady than the inside ones. I therefore decided to abandon these separators entirely, and to adopt and perfect a set made upon a plan on which I had constructed a separator in 1877 or 1878. This consisted in the use of screws passing through the ends of the bows on each side of the teeth to be separated. By the means of these two parallel screws I could apply the force on each side of the

FIG. 4.

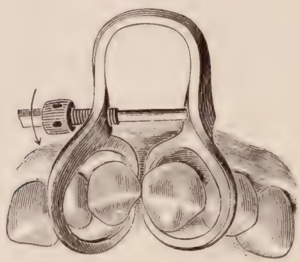
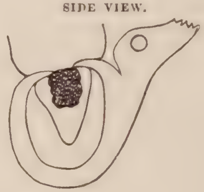
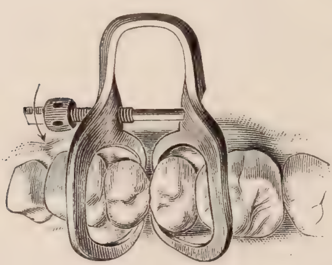


FIG. 4.
SIDE VIEW.



teeth where it was needed to give great steadiness, and I could dispense with the projecting shank and could somewhat reduce the size of the bows. By cutting right and left threads on opposite ends of the bars I secured rapid movement of the bows, and by making the middle of the bars square I secured the means of applying a wrench for turning them. The wrench being straight at one end and having nearly a right-angle curve at the other, it was easy to turn the bars in any position the separator might be placed. This remodeled separator is shown in Fig. 6. As the bars are set below the line of the gum, and as the bows are turned back out of the way on the sides of the teeth, the emery-tape can be not only passed between the teeth down to the gum, but it can also be considerably wrapped around the tooth toward the lingual and buccal sides so as to finish to a natural contour. With this separator the approximal surfaces can be approached as readily from one side of the tooth as from the other, and the advantage from this as well as from the unobstructed light that can be thrown upon even the most obscure parts of the approximal surfaces can be fully appreciated only by seeing the separator in operation. With teeth of narrow necks there is a ten-

FIG. 5.



dency to slip toward the gum when the screws are turned, but this can be overcome in a most effective manner by the use of wedges placed between the bows and the ends of the teeth. As the whole separator is made as close-fitting as possible, it is very easy to adjust the wedges securely. For this purpose I have used wedges of wood, cork, and lead, but I have found nothing that has proven so convenient and effective as little masses of red base-plate gutta-percha, warmed and placed under the bows just as one is ready to commence the turning of the screw. It adapts itself so completely

FIG. 6.

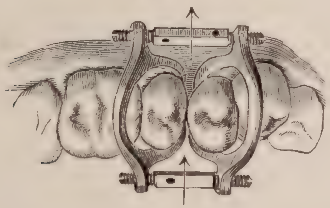
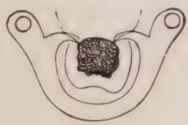


FIG. 6.

SIDE VIEW.



to the ends of the teeth and to the bows that when it has cooled and hardened the screws can be turned as tight as desired, with no chance of displacement or danger of the jaws of the separator reaching the gum. In fact, the separator is then held so firmly that the fingers may rest upon it for support, to the greatest advantage, and with no danger of disturbance of the separator. In the performance of delicate operations this opportunity for steadying the fingers and hand is of the utmost importance.

FIG. 7.

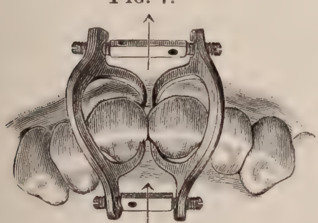
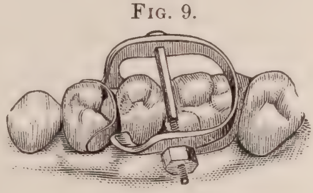


FIG. 8.

FIG. 9.



I have had little arrows stamped upon the separator to indicate which way the screws are to be turned in putting it on or taking it off. The separator designed on this plan for the front teeth is shown in Fig. 7. The bar is shorter and the bows are made to converge on the inside of the teeth because of the smaller circle. This separator operates as well upon the lower as upon the upper teeth. Those for the back teeth are very readily adjusted and operated, and it is with them that the great advantage of this form of separator over that of the other will be seen.

After a considerable trial in actual practice of separators made on this plan, I have become satisfied that they will easily accomplish all that can be expected of any device for the immediate separation of the teeth. My first form of separator, having but one screw to manage, is a trifle more quickly applied and easily operated, but in no other way whatever have I found it to possess any advantage. The double screws work easily and give no trouble whatever if only a little care is taken to turn them about equally.

It may be well to say here that care should always be taken in using the separator upon the superior central incisors, because of the possibility, with young patients more particularly, of opening the suture of the superior maxilla. This has never occurred with me, nor have I ever heard of its occurrence with others, but it is well to bear in mind the fact that it might occur if the screws were used injudiciously.

Besides the gaining of space for the performance of operations on the approximal surfaces of the teeth, there is another most important use to which either of the two classes of separators which I have described can be put. I refer to their use as matrix-holders.

Nearly a year ago my associate, Dr. Wm. Woodward, presented me with a set of steel matrices, designed by his brother, Dr. J. A. Woodward, who has since illustrated and described them in the Dental Cosmos for June, 1885. I have found them almost invaluable. In discussing their merits with Dr. Darby, who had also found them of great service, he suggested to me that they would be held very securely in position by the use of my separator. I saw at once the value of this suggestion, for I had not always been quite successful in securing them in position by Dr. Woodward's method of wedging. Upon trial I found this plan to work admirably, but there were still some little defects. Being made of steel and tempered, they were not as adjustable as I desired, and they were not of quite the right shape to be always well held by the separators. I therefore substituted brass, and changed their shape to that shown in Fig. 8. As will be seen, they are long enough to wrap well around the tooth, and the shapes are such as to fit them well to the festoon of the gum and to give the separators a firm hold upon them. This will be seen by a careful examination of Fig. 1. I use them in the following manner: I adjust the dam and apply the separators, turning the screws until the teeth are sufficiently separated to allow the matrix (which is now flat) to be slipped between the teeth. I then remove the separator entirely, and bend the matrix closely around the tooth. This being done, I replace the separator, putting the jaws over the matrix, and then tighten the screw as much as needed. After the filling is completed I remove

the separator and straighten out the ends of the matrix, and then re-apply the separator on the tooth alone. By turning the screw the matrix is loosened and removed, and then the filling is finished with no danger of the slightest loss of contour. The malleability of the brass matrix may be taken advantage of in securing a full contour, for wherever it is desirable to swell the filling it is only necessary there to use the lead or the automatic mallets. Under the application of such force the matrix yields slowly, and the filling can be bulged even beyond the natural contour, if desired. This same malleability of the matrix can also be made to help in securing perfect margins.

It is undeniable that there is danger in the use of a matrix of any kind, for in packing along the margins of the cavity it is only by the very greatest care that a perfect adaptation of the gold can be secured. In fact, it may be doubtful if a perfect adaptation is often made if the matrix fits the tooth absolutely and unyieldingly, and I have found a real advantage in driving the gold and the matrix, by mallet force, a little beyond the edge of the cavity, when this can be done,—as it can be if the matrix is thin.

Large approximal operations, where restorations are required, can be very expeditiously performed by this combination of the adjustable matrix and the separator. I have found the velvet cylinders recently brought out by The S. S. White Dental Manufacturing Co. to be a most beautiful preparation of gold for all operations where matrices are employed.

In large cavities which extend under the gum these matrices, as well as those of Dr. Woodward, are of great service in depressing the gum and carrying the rubber-dam above the margins of the cavity.

I have occasionally made use of the matrix in another operation which I have sometimes performed with considerable satisfaction. It is that of cutting through from the buccal or the lingual side, instead of down from the grinding surface, when small cavities near the gum on the approximal surfaces of biscuspids and molars are to be filled. It is not an operation to be performed, however, if decay approaches near to the grinding surface, for frail structure here is liable to be broken away by the force of mastication, even though the arch of enamel is supported by a solid filling. In the performance of such an operation, the part of the cavity most difficult to fill accurately is that along the lingual border, when the cavity is opened into from the buccal side, or along the buccal border when approached from the lingual side. In such cases I have used a thin-edged brass matrix, held in place by the separator, as shown in Fig. 2.

I have found the little device shown in Fig. 9 to be an excellent matrix-holder. It is a modification of the Jarvis separator, which I designed for retaining the teeth in position after they had been separated by any means whatever. As a supplement to the Jarvis

FIG. 10.

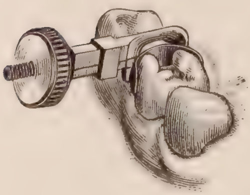


FIG. 11.

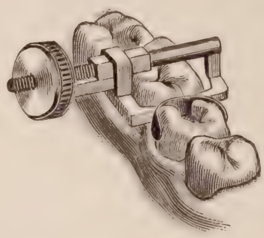


FIG. 12.

separators, it can be made of considerable service. It gives access to the teeth, and is out of the way, and I have used it a great many times for retaining the teeth after they had been separated by my own or by the Jarvis separators.

Figs. 10 and 11 represent devices invented by Dr. Darby, and intended for holding matrices of different kinds in position. He presented me with one of each, and they are so novel and ingenious that I have obtained his permission to illustrate them in this article. They are so easily applied, so positive in their action, and so much out of the way, that I have used them with a great deal of satisfaction. I am of the opinion that the teeth can be somewhat separated by wedges operated upon this plan.

The finishing of fillings is rendered easy by the use of either of the remodeled separators. The double-barred separator particularly is so completely out of the way that every kindof finishing device can be used. Feeling the need in some cases of a smaller sand-paper disk, and a more delicate mandrel, as well as some means of holding the small screw that must go with such a mandrel, I devised, in part, the mandrel and screw-holder shown in Fig. 12. I desired a screw-driver which should also be a screw-holder, in order to avoid the vexation of dropping upon the case or the carpet the little screws which have so often to be removed and replaced in renewing worn-out sand-paper disks.

I requested Mr. Weber, of the New York Dental Mfg. Co., to make for me a mandrel as small and delicate as possible, and to provide

for the means of holding the little screw when removed from the mandrel. I gave him drawings for a screw the head of which was to be drilled and tapped by a still smaller screw, the threads of which were to be cut in the opposite direction. The screw-head was also to have the usual slot for the ordinary screw-driver. One end of the screw-driver was to fit this slot in the ordinary way, and the other end was to be a left-handed tap or screw, which was to fit the hole which had been tapped in the head of the screw. It will be easily seen by this that to continue to turn the tap after it had reached the bottom of the hole in the head of the screw must be to turn the screw itself, and to remove it from the mandrel, and to hold it securely on the tap end of the screw-driver. In reversing this, and returning the screw to the mandrel, it would turn until the friction of the screw in the mandrel became greater than the friction of the tap in the head of the screw; when the tap, continuing to turn, would become disengaged from the head of the screw. The screw would then be turned to its place in the mandrel by the screw-driver in the usual way. After working upon it for a time, Mr. Weber suggested that, instead of tapping the hole in the head of the screw, the same result might be more easily reached by slightly tapering the hole, and driving into it a hardened four-cornered steel instrument, which would swage the hole square, so that a screw-driver made to fit the hole would also act as a screw-holder as well. A trial of this proved that while the screw was not held as postively as by the first method, yet, if accurately made, it was held with considerable certainty, and since the method of manufacture was considerably simplified, I decided to accept Mr. Weber's suggestion, and have them made in this way. The small disks are very convenient in finishing on the approximal surfaces when the separators are in place.

MAN AND HIS TEETH—HE MAKES HIS OWN SKELETON.

BY T. DWIGHT INGERSOLL, ERIE, PA.

If it be true that man's organization is his greatest study, to neglect it may by some be considered his greatest crime. However that may be, a glance at his progress thus far in self-study would suggest inattention or incompetency to discover and appreciate the most important facts and mental phenomena connected with his existence.

In the dental profession there seem to be two classes of investigators; one taking a view of man in the light of science, while the other class is, apparently, guided more or less by a dim, supernatural light, which is sometimes obscured by clouds of unknown vapor.

Progress with students of that character is slow, as it is often interrupted by a dicussion of some wild theory. This statement will not be considered an extravagant one after a glance at the papers that have been contributed to the dental journals during the last decade, which show a wonderful diversity of ideas and beliefs, some of which have but few facts for support.

The old doctrine of "vitality," advanced by heathen philosophers, still clings to the minds of some in the dental profession, who believe that vitality not only builds up tissue, but acts resistingly against chemical force, which causes decay of the teeth. Dr. M. S. Dean seems to have had a firm belief in the doctrine when he declared, "That there is a special vital force that presides over living, organic matter, and directs its form and arrangement in the body,—in addition to the chemical forces,—in my mind scarcely admits of a doubt." "My own practice and observation," Dr. Kingsbury remarks, "have satisfied me that there is a vital force existing in the hard tissues of the teeth." The words of Liebig have been quoted in support of the doctrine, though extracts might have been made from writings of men of his time as eminent in science who opposed it on scientific grounds. The doctrine is now abandoned as without a foundation of facts by nearly all the best naturalists of our time; and those who still advocate the existence of such a force are regarded by them as laggards in the march of scientific thought. The "germ theory" at one time engaged our attention, from the supposed fact that leptothrix, micrococci, and other microscopic vegetable and animal organisms were gnawing cavities of decay in the teeth! The minute shell- and rock-boring animals in the ocean had been known to scientific men a long time; but how microscopic beings could be so suddenly "created out of nothing," and bore holes in the teeth, no one was able to explain. Other wild ideas might be named, but one more will suffice to show that we ought to place a more vigilant watch over our theory-making propensity.

The supposed value of Graham bread and other phosphate-bearing kinds of food for a more perfect development of the teeth, to prevent decay, has had a strong hold on the minds of some of our most intelligent dentists. It was supposed that lime must be taken into the system, without which the forces within would not be able to supply from common food all the elements of which the teeth are composed; but, although the mother eats sea-shells and limestones, there is no certainty that the teeth of her offspring will be more perfectly developed or less liable to disease. The infant who takes no food but the mother's milk is furnished with a good set of deciduous teeth. It is the function of the organism to supply the hard

parts of the body from an animal and vegetable diet. In that way fishes, birds, and terrestrial animals are provided with bony skeletons, and insects are supplied with horny mandibles and chitinous coverings for the body. The idea that nature furnishes her organisms with all the lime they need corresponds with the geological idea that there was no lime in the earth until coral-making animals and other lime-producing beings came into existence. While the first small bodies of water were increasing little by little to the dimensions of inland seas, here and there on the warm, steaming earth the seas constantly rising and commingling with each other until an almost universal ocean was formed, encircling the globe, the tropical temperature of the water being favorable for marine life, the ocean became filled with microscopic and other lime-making animals, whose remains were imbedded in the rocks that were formed under the first Silurian ocean. Mollusks in the oceans, lakes, and rivers are making at the present time an abundance of lime, but they have nothing to do with a second-hand article in forming their shells. Coral-making polyps are building coral islands and coral reefs from microscopic beings in sea-water; but the great, six foot, boneless sturgeon in lake Erie has no use for lime, although the bed of the lake is made of limestone. A mother has sometimes a strong desire for limy substances, but it is not a sure sign that food of that character is needed for the fetus. The desire, it may be, arises from a somewhat deranged state of the system; but, let her eat what substances she will, there is no certainty that a particle of the mineral will ever be appropriated; all excess is cast out, or perhaps retained as calcareous deposits on the teeth, or in various cavities of the body. Man, like all animals, makes his own skeleton; and it is believed that no one ever avails itself for that purpose of lime which has been formed by any other living being. If this be so,—if the life-forces care nothing for a crude mineral,—the uncertainty of the value of Graham bread and other limy substances is very apparent.

Let us now turn from past to recent modes of thought which pertain to development and decay of the teeth. If it can be shown that development is often imperfect, the ever-recurring question, "Why do teeth decay?" will be more easily answered. Development of a tooth or a bone refers the investigator backward, directly or indirectly, to the very starting-point of an individual life, which is a microscopic speck of protoplasm, having bound up in it the form and potency of a full-grown man. This delicate bit of living-matter is not in the least dependent on vitality or any extraneous force or influence for growth and a continuance of existence. It is entirely helpless; and unless nutrient matter is supplied, and

certain conditions are met for its growth, *no power on earth can keep it alive.* As it increases in bulk by being in contact with proper food, centers of molecular action are formed, differentiation begins, and those particles that are similarly affected become grouped together for development into organs; but how differentiation is really effected we know not, nor do we know how the different groups become the organs of a man instead of those of an elephant or of an insect-devouring pitcher-plant, unless it is because the protoplasm at the starting-point is different in kind from that of other organisms named. It seems probable that different kinds of protoplasm do exist. Professor Rider has called attention to the difference between the ova of various species of fish, and he would without doubt expect to find the ovum of an American different from that of an African. Were that the case, a variety of molecular action would be instituted, not only for the different races and families, but for every individual, each arising from a certain kind of matter having a peculiar action of its own.

The grouping together of particles of matter having the same characteristics may or may not be regarded as the result of concretionary action; it may or may not be regarded as an act of will or choice, or that of chemical force. Differentiation begins in some way, and ends in more or less perfect organs; each entering upon its own functional action; each having a special work to perform; but all under an autonomy similar to that of a colony of coral-making polyps whose sides are all connected by a tissue of living-matter, being dependent on one another for harmonious action and life. The group which acts for the formation of the teeth is enabled to appropriate the requisite elements and arrange them in typical form, unless some force or influence sets up an interference, which causes imperfection, and abnormalities. Changes of temperature, contagious diseases, and untoward physical forces, which have always environed the human race, may be considered as interferences to the perfect fulfillment of organic law. These, together with vicious habits and some of the results of civilization, have had an unfavorable effect on health, resulting often in great debility, which is a precursor of imperfect development.

Mr. Francis Fox, in the *Medical Times and Gazette*, says, "It will suffice that I remind you that the process of development is a very gradual one, and in neither case is it quite completed until some time after the teeth have assumed their ultimate position. We, therefore, at once perceive how liable they are to be affected by any untoward circumstances which may arise in the course of development and growth of the body. Without doubt, the early decay of teeth, which so sadly marks the present generation, is due to mal-nutrition occurring in the earlier periods of life."

"By defective tissue," says Dr. W. H. Trueman, "we understand defects like those found in teeth denominated soft and chalky. They are generally, if not entirely, due to a depressed state of the system at the time the teeth are developing. This is often associated with (if we may be allowed the expression) a general viciousness of the system. Not only are the teeth defective in quality, but they are also defective in vitality; they show no disposition to resist the destructive agents around them."

There seems to be sufficient evidence to show that many teeth are really defective in structure, and also that defective teeth are first attacked by caries. If, now, it can be shown that caries is the result of chemical action, this paper will have accomplished all it intended to do toward solving the problem of decay.

"Caries is an effect," says Tomes, "of external causes in which vital forces play *no* part. That it is due to the solvent action of acids which have been generated by fermentation going on in the mouth, the buccal mucous probably having no small share in the matter; and when once the disintegrating process is established at some congenitally defective point, the accumulations of food and secretions in the cavity will intensify the mischief by furnishing fresh supplies of acids."

"There is not the slightest doubt in my mind," says Dr. Frank Abbott, "as to the origin of caries of the teeth. The first lesion under all circumstances is due to the action of an acid, which in a merely chemical way dissolves out the lime-salts from the enamel. Nations of high civilization, which inevitably leads to bodily and mental deprivation, as a rule have a greater percentage of carious teeth than those of a lower degree of culture, or with no culture at all. However this may be, the fact that caries of the teeth begins as a chemical process scarcely will in my opinion be questioned."

All teeth do not equally degenerate. Some endure through life, while others in the same mouth are destroyed early; and this may occur at different times of development under different states and conditions of the body, the perfect teeth having been formed when the system was in the best condition. That there are such different states no one will probably doubt, nor will any deny that some teeth decay early while others in the same mouth always remain perfectly sound. This forces the conclusion that perfect teeth under ordinary circumstances will not decay, as their substance has not sufficient affinity with corrosive agents for their destruction.

The apparent increase of imperfection and disease of the masticating apparatus has led to some speculation about the probable effect it may have on future generations. Some who favor the doctrine of evolution imagine that "the combination of forces which

are degrading the teeth, and reducing them, reasoning from analogy. renders it highly probable, according to all human power of prediction, that the 'coming man,' whatever else he may be, will certainly be edentulous." The idea is strenuously opposed by some who do not believe in evolution, and they have attempted to prove that, instead of entire loss, the teeth will become more beautiful and quite perfect in structure. It is sincerely hoped that such a condition of the teeth may some time exist. Civilization has had a refining influence not only mentally but physically; the teeth have become smaller, lighter in color, more pellucid, and almost nacreous in appearance, giving to the belle a wonderful charm never possessed by her naked, animal-like ancestors, "who lived in the land of Nod" thousands of years before Adam's apple-tree was planted in the Garden of Eden. This is the bright side of the question. The good work of reform in outward appearance has been in progress ever since civilization began; but the physical forces, which are always at war more or less with the organic, have followed man down the ages, undermining important parts of the structure, and now the evolutionists predict entire destruction; but such a result will probably never be known. Man and other organisms of great complexity have never lost an organ by any transformative action. A phenomenon of that character would be contrary to the wonderful uniformity of action in the laws of nature, although there have constantly occurred certain changes in the opposite direction, during the embryonic state, leading up to man through various pseudo-metamorphosed forms. Prof. Chaillé, A.M., M.D., in the *Medical Record*, says, "The most striking of these embryonic stages are,—the ascidian, the amphioxian, the piscine, the reptilian, the mammalian, the quadrumanous, and the human."

Now, after nature has persisted so long in the struggle for the preservation of species according to original type, against the action of physical forces, selecting from the noblest forms the best principles of organization, and the tenderest phenomenal life, embodying them one after another in the different species with an upward trend toward the climax of an angelic perfect whole, it may not for a moment be supposed that any important organ will ever be destroyed.

APPARATUS FOR REGULATING TEETH.—DOUBLE ROTATOR.

BY J. N. FARRAR, M.D., D.D.S., NEW YORK, N. Y.

No. XXVI.

(Continued from page 277.)

OCCASIONALLY the superior central incisors are erupted or subsequently rotated more or less out of line, and such malpositions may be said to be of four varities: First, when the normally distal surfaces have a palatine expression, as illustrated by Fig. 159. Second,

when their anterior surfaces approximate, as seen in Fig. 160. Third, when both are out of line, but face in the same direction, to the right or left. Fourth, when only one of them is abnormally situated.

Irregular central incisors in either of these varieties may be regulated by Dr. Guilford's unique little device, illustrated in the DENTAL COSMOS for November, 1879, or by some modification of the

FIG. 159.

FIG. 160.

writer's triplex system, as may be seen in Fig. 161. The bearings upon the different points of the teeth, and the directions of their movements, are indicated by the arrows, while the details of construction are shown in the figure, and the device is made as follows: A stiff strip of plate, T, is bent in a form to loosely fit the necks of the teeth at certain points under the free margin of the gums, and prevent the plate from slipping from the teeth, and the ends of the plate are shaped to bear firmly on the distal corners of both teeth. These bearings may be changed by properly bending the ends of the plate as the operation advances. The bridge, C, carries two rollers, w w, between which the thin ribbon loop, L, passes and is caught by its fold on a wire attachment to the middle

FIG. 161.

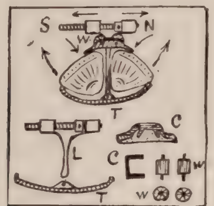
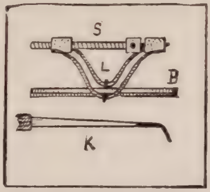


FIG. 162.



of the bar, T, as shown in position on the teeth. The screw, S, is swiveled in the N end of the metallic ribbon loop, and screws into the threaded end, with the effect of separating the ends of the loop, which thus moves the bridge towards the bar and rotates both incisors.

Other modifications of this device may be adapted to different presentations of this class of cases, the main thing to be kept in mind being the points of the bearings of the bridge, C, and the bar, T; for while the apparatus will work well when the teeth have small necks, it is difficult of retention upon tapering teeth.

In some cases a firmer hold on the teeth may be obtained by a pair of narrow loops, the folds of which pass on either side of the bar

around the ends of a pin passing through and projecting from the middle of the bar, as shown in Fig. 162. The bar thus made and connected is easily detached for the purpose of bending its arms to obtain rotative bearings. A key for turning the screw may be readily made from an excavator shaped as shown at K, Fig. 162.

FIG. 164.

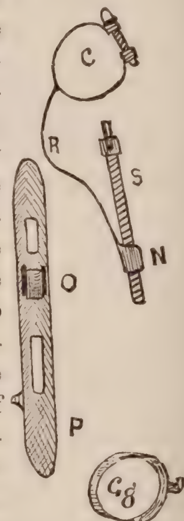
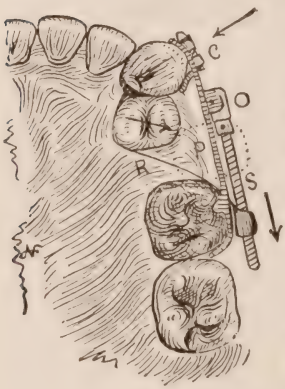


FIG. 163.



In simple cases of irregularity, as, for instance, when the cuspid and bicuspids are overcrowded, and the maxilla so small that it cannot be expanded to furnish room for a rearrangement of all these teeth, the only alternative may be to remove one of the teeth, first carefully observing the occlusion and all the other circumstances before deciding upon the tooth to be removed. Fig. 163 affords an example of a case wherein the extraction of the superior left second bicuspid—shown in dotted lines—was deemed advisable. The figure shows also a modification of mechanism belonging to the triplex system of regulators, adapted to the requirements of such a case, and, like many other devices described by the writer, this one is of somewhat difficult construction; but when properly made and applied, the main portion of the work of the operator may be said to be

FIG. 165.

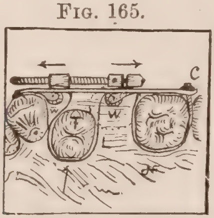
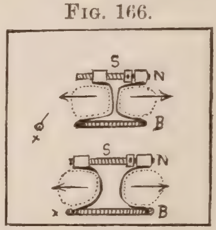


FIG. 166.



practically completed, and thenceforward there remains but the repeated turning of a single screw to force the two irregular teeth into line.

Fig. 164 shows in detail the several parts of the device, which will be described with reference also to its position in action, as seen in Fig. 163,—the same letters indicating like parts in both figures.

A thin, narrow metal band is first fitted around the neck of the cuspid on which it is to be clamped by the screw coupling, C. A

strip of thick plate, P, is slotted as shown, and has soldered to it two brackets, between which is pivoted the journal box, O. In shaping the bridge, P, a lip or spur is formed near the rear end, as shown, to be bent down on the molar to keep that end of the bridge from sliding towards the gum. The loop of the cuspid band, C, is now passed through the front slot of the bridge, P, and one end of a narrow metal ribbon, R, is soldered to the back of the band. The other end of the ribbon, R, is passed through the rear slot of the bridge and soldered to a threaded collar, N, which receives the screw, S, the spindle end of which is then inserted in its journal box, O, and the completed device put in place on the teeth as shown in Fig. 163. To prevent the creeping of the band, C, under the gum, a gum-guard ring, like C 8, Fig. 164, may be used.

A further modification of the device for a similar purpose is illustrated in Fig. 165, but in this instance the bridge is clamped to the molar, and the ribbon, L, passes through a long central slot in the bridge, over which the operating parts slide freely in both directions, while drawing the bicuspid outward as indicated by the arrow.

It is sometimes desirable to separate teeth for a considerable distance, and for such regulating purposes the device shown in Fig. 166 will prove effective, and move the teeth directly acted upon, as also the contiguous teeth in the directions of the arrows. The construction and application is made obvious by the illustrations; it being only requisite to add that, instead of cutting the narrow ribbons from thin plate, it is better to make them of wire rolled very thin.

PRACTICAL METHODS IN PRACTICE.

BY ALTON HOWARD THOMPSON, D.D.S., TOPEKA, KANSAS.

[Read before the Missouri State Dental Association, at Sweet Springs, Mo., July 7, 1885.]

At the last annual meeting of this association the writer had the honor of presenting a paper upon "Scientific Methods in Practice," in which he endeavored to describe the process of the development of the scientific method from crude empiricism; and tried to show also that we were not yet freed from the trammels of the empirical practice, and were, indeed, very far from the perfect application of scientific methods in practice. The latter includes deduction and comparison, supplemental to and necessarily founded on experiment. But it was shown also that our art, while yet empirical, had far outstripped our science in the race for perfection, and that the need of the age was fresh science,—new facts,—whereon our art and our practice could feed and grow; and that, if no new science was furnished it, our art was bound to retrograde and decay.

The present paper is intended to supplement that former one, by endeavoring to show the reach and limits of *practical* methods in practice.

It is needless to insist that the scientific method is the practical one; that the educated operator *knows*—to the limits of present professional culture—the characteristics of disease, the alterations necessary to be produced in the features of a disease to effect a cure, and the means of doing this. *He* does not experiment, first with one thing and then with another, till he finds something to help the patient, like the ignorant empiric, but, knowing the right thing to do at once, he does it. It is preëminently practical as well as scientific to know what to do without delay. It is simple science to *know*,—*i. e.*, to *know* a disease when we meet it; to *know* what to do to *cure* it; to *know* what to employ to effect this cure, and to *know how* to apply the remedy,—and really nothing is more practical than this varied knowledge. Therefore, the educated, the cultured, the skillful man, is he who knows the science *plus* the art of his calling, and is fitted for its practice above the *un*educated.

It too often happens in our day that operative and artistic ability and skill are not combined with scientific attainments and culture in the same individual. The finest operators are often very poorly informed upon scientific matters, and the scientific man is too often a poor operator and practitioner. It is too much to say, perhaps, that scientific attainments and operative ability are rarely combined, for many brilliant exceptions will occur to all of you; yet there is no doubt but the combination does not appear as frequently as it should in the ranks of the dental profession. Too many investigators push their science to the extreme of subordinating practical things; and too many operators of conspicious ability neglect the science of their calling, and consider it secondary to practical accomplishments. There is a growing disposition to separation between science and practice, but the divorce of the two would be the downfall of both. This tendency must be checked by all leaders and writers who have the good of the profession at heart. Partial culture means total failure, and only the fully rounded man, he whose head and hand are both well trained, can succeed and sustain professional excellence and standing. There is a wide-spread belief that the scientific man is necessarily impractical *because* scientific; that science *per se* does not declare dividends, and that it and its devotees are therefore practically useless. This feeling must not gain a foothold in dental culture, or that culture is lost. The scientific man must be regarded and honored, for he is the creator, the conservator and the teacher of that knowledge which renders art practicable and the cure of disease possible. Science is to art as food to work.

It is the purveyor of knowledge, upon which serviceable skill is founded, and by furnishing working knowledge renders skill possible. It serves humanity through its handmaid, art, and art can no more ignore its teacher, science, than science can refuse to own its worker. And what can be said in defence of science and its devotees can with equal if not—on account of its valuable field—greater force be advanced also in behalf of practical methods and the practical man. His is the all-important field of the utilization and application of science in the work of tooth-saving. His is the duty of employing the knowledge of diseases, and the methods, remedies, operations and materials for the cure of disease, which science lays before him. He is the "middle-man" between science and its service of humanity, without whom man would suffer and perish in spite of centuries of accumulated knowledge. Let us not, therefore, permit the all-absorbed scientist to crowd the practical man to the wall, to dismiss practical things as beneath notice. The practical man has his place and his value in the dental world, which is of just as much importance as that of the scientific man, and is entitled to as much consideration. But the practical man has the advantage, in that his department is stronger, is further developed and better equipped, than that of the scientific man. His work is further advanced in all the elements of progress, and has attained a place far in the van of the march of science. His methods, which have been so successful in practice, have been attained by process of empiricism, it is true, but by a course of tireless, intelligent experiment, which challenges the admiration of the intelligent world. He has fully employed all that science has provided him with in the way of knowledge, and then launched boldly out into the unknown sea of baseless experiment, and accomplished successes in the treatment of disease and the salvation of teeth that are simply marvelous. He has sought only for effect, no matter where or by what attained. The practical method with him is that which succeeds, for with him "nothing succeeds like success." Success with him means honor to his profession, as well as support to himself, through the possibilities of tooth-saving or restoration. So he has worked and experimented until mountains of difficulties have melted away and unlimited success is his.

In the treatment of the one disease of dental caries, for instance, how little is known of the real nature of the disease, and yet how successful has been the treatment of that disease by practical methods, attained through generations of experimenting, industriously and intelligently prosecuted. He is progressing upward and onward in the attainment of still greater victories in the work of tooth-saving, and a lagging science does not even keep in sight of

him. Practical methods have so far outstripped her. But once the pathology of caries is thoroughly comprehended,—and we are undoubtedly making giant strides in that direction,—practical treatment will advance to possibilities not now dreamed of. We are now most in need of positive knowledge of the pathology of diseases with which we have to deal. Take that other disease, *pyorrhea alveolaris*, how less than nothing we know of its real nature, and yet on the practical side, by tireless experiment, we are attaining successful methods of treating it. But of the nature of the disease, or why our methods should be successful, we know nothing. If our science were equal to the demands of the day, we would know the disease, the alterations in its features necessary to approach its elimination, and the means of attaining this much-desired end. The rest would be simple. But our science is deficient; it cannot respond to our appeals for light; and so the practical man must experiment and feel his way until he has the same success he now attains in the treatment of caries. He will find the remedy, because he *must* meet the demand made upon him for its cure. The chances are largely in his favor that he will, in this case also, take the laurels from the scientific man, as he did in the treatment of caries.

Of late years wars have been waged, and science and practice have alike been outraged, in the interest of revolutions tending to the overthrow of established modes of practice. Crusades have been organized and prosecuted against conservative and hoary theories, and missionaries have preached new gospels and endeavored by fire and sword to spread new propagandas. But if their words have been hot and furious, opposition equally as bitter has been aroused to meet them, and battles were fought which resulted, as all such controversies do result, in the exhaustion of both combatants, and the compromise of both theories in practice. Out of one of these controversies it comes to pass that the lion, gold, and the lamb, amalgam, dwell together in peace and harmony in the practice of nearly all operators in this country to-day. The fight was long and bitter, but it did not banish either material from the field. On the contrary, it taught the profession more of the science of caries and of the two materials than it ever knew before, and led to a more extensive use of *all* filling materials. All honest, capable practitioners use gold, amalgam, cement, and gutta-percha with proper discrimination and better success in tooth-saving now-a-days because of the educational effect upon them of the New-Departure controversy. More teeth are being preserved in this country to-day because of the study and thought that discussion provoked. More teeth are filled to-day with gold than ever before, and that in the face of the wide-spread use of the plastics. Gold still holds its place,

and is indeed gaining its proportion upon the plastics. And finer fillings are the rule now amongst the rank and file, who have a praiseworthy ambition to emulate the examples of the masters. Its usefulness is extending, also, and more difficult cavities are being brought under its rule, by the improvement in the preparations and instruments furnished us, and progress in the methods of working gold. It has not been injured by the plastic agitation, but, on the contrary, has been benefited. The ordinary practitioner was led by the plastic advocates to attempt to fill teeth he before extracted, and with such gratifying results as to encourage him to attempt better things in gold. He does this and succeeds, and step by step progresses in his employment of gold until he develops a creditable ability. He then becomes ambitious, seeks instruction, and progresses onward in the right path. In this improvement in the rank and file—and it is more general than is usually supposed—there is an advance forward of the body of the dental profession in this country. The mediocre operator finds that his methods are similar to those of the best men, and eagerly seeks to learn more, that he may do better. This is a good sign, and promises much for the advancement of artistic operating with the mass. It therefore becomes those who are recognized as representative operators to not weary of teaching and preaching artistic skill, for their labors are literally bearing golden fruits. The mass are anxious and willing to be lifted up to a higher plane of artistic ability. They care little or nothing for the science of the profession, but are desirous of improving their methods and doing finer things in practice. And it does not so much matter that they ignore science, for the scientific men must be made of the students who enter our ranks,—the plastic material which must be educated and trained almost from the cradle for the work of investigation. We do not ask the practical man to do this, for he is unfit as well as disinclined, and will be useful in other ways.

The plastics are also in more extensive use and are saving more teeth than ever before, because more teeth are filled with them, and the powers of tooth-saving are being extended in all directions. But the places of the plastic materials are becoming more strictly defined as their preserving qualities are becoming better understood by experiment and experience. An undefined, almost unconscious, strictness of discrimination is prevailing and increasing amongst all classes of operators in the selection of filling materials. This indicates study and close observation, and means unmistakable advance. The offices of amalgam, of gutta-percha, and the cements, in their varieties, are being hedged about and more closely controlled and studied, that their reliable saving qualities may be better defined.

As the qualities are improved or increased, further conquest in tooth-saving results, and further restriction in the directions of gold encroachment also follows.

The plastics are being encroached upon in every direction by the tyrant and king of filling materials. The practitioner extends the area of his tooth-saving powers with the plastics as a sort of pioneer reaching out into the wilderness of unsaved teeth, and as he succeeds he follows up his victories by the plastics with gold, so that, as the plastics redeem from the wilderness, gold gains upon the plastics. So, by the very success of the plastics the sphere and capabilities of the noble metal is widening. All ambitious men have a laudable desire to extend their gold operations, gradually abandoning the plastics as they can employ gold, and thus developing higher ability and making the plastics serve a tentative purpose. So the sphere of the plastics is being contracted and that of gold extended more and more. By the plastics new fields are won, and gold follows the pioneer to improve and develop these fields.

In regard to other departments of practice, we may say that in some we are gaining rapidly, in others standing still, and in still others are retrograding and losing ground. For instance, experimentation with all sorts of scientific and unscientific remedies and operations for the treatment of *pyorrhea alveolaris* is just now the fashionable thing, and the amount of pain that will be inflicted upon suffering humanity in the experiments on this disease in the next few years is something appalling! But science and practice must advance, and humanity must furnish the clinic material; so we will march ownward. In this disease we are advancing at railroad speed. In regard to caries, we are in its treatment making some progress toward preserving more teeth, and that, curiously enough, because of the development of materials and a better knowledge of their capabilities than for any other reason. In the preservation of dead teeth and the treatment of alveolar abscess we have gained practically nothing in ten years. In prosthesis we had fallen behind deplorably until five years since, when there was a reaction, and there is now perceptible improvement and advance in the art of restoration. In attaching crowns there has been remarkable development within a few years; and it, too, is now a reigning fashion. In its kindred bridge-work there is great activity, and beautiful things are produced which await the verdict of experience. It, too, is a fashion. But those things that are of such rapid growth are apt to suffer reaction which does them much undeserved injury. Operations of all kinds should be cautiously performed, and the development of new features should be watched with interest before hasty adoption.

We must avoid undertaking too many "fancy" operations,—a straining of the possibilities of manipulative dexterity, or overestimating the environments in the mouth. Finally, wrought gold restorations, either in crowns or bridge-work, upon insufficient foundation, should be avoided. Our ambitions must not be unreasonable. There is an ideal for every operation and every cure, toward which we must be continually reaching with our best endeavors; but our ambition must be kept in restraint. If the ideal were attained, there would be an end of ambition, and striving would cease; and with the rule that repose is impossible, the inexorable law of motion would cause retrogression. So, it is better to obey the stimulus quietly, economizing, as it were, our ideal, that we may keep it ever before us, and be satisfied with gradual growth. Let us not endeavor to reach perfection at a bound, seeking to ignore time and space, but be content to advance slowly over the intervening ground, carefully gathering its valuable lessons of experience and instruction. Let us cherish the inspirations of the ideal as the daily nourishment of our aspirations for better things, that our ambition may develop symmetrically and our whole professional being be rounded in the proportions of beauty, and its every organ and tissue bear the impress of perfect formation and development.

CLINICAL REPORTS.

HOSPITAL OF ORAL SURGERY.

CLINIC OF PROFESSOR JAMES E. GARRETSON, M.D.

Removal of Maxillary, Turbinated, Nasal, Lachrymal, and Ethmoid Bones.

An operation rare as to character and immediate result was performed at the hospital July 11th by Prof. Garretson, assisted by Drs. Cryer and Shimwell. The patient, a gentleman 68 years of age, had applied at Wills Eye Hospital for treatment of an ectropion of left eye-lid. Examination by Prof. Keyser quickly revealed the condition to be dependent on an engorgement of the antrum, which was projecting the orbital floor, thus producing an apparent but not a true ectropion. Sent from the Eye to the Oral Hospital, further exploration exhibited extensive involvement of the maxilla, while a polypoid mass, reaching back into the throat, completely filled the nostril of the involved side. By inference a conclusion was accepted that not only the inferior turbinated bone, but as well the scrolls of the ethmoid, were involved. The disease was pronounced to be osteosarcoma.

The possibilities of the case being carefully studied and the patient

being etherized to that proper degree which does not overlook a required sensibility on the part of the larynx, an incision divided the superior lip at the median line, and was carried up around the ala of the nostril, being terminated over the frontal sinus. Next, the nostril of the involved side was fully exposed by dissecting aside the soft parts. A succeeding step uncovered the whole anterior face of the maxillary bone by means of a second incision carried along the wrinkle below the free border of the eyelid outward to the malar bone.

An immediately succeeding performance considered the removal of the maxilla. This was accomplished by means of a circular saw revolved by the engine, the bone being separated, first, along the median commissure as far back as the horizontal plate of the palate bone; second, the maxillo-malar articulation was divided; third, the nasal process was cut across; and, lastly, as the use of the saw was concerned, it was shown that it was possible, indeed not difficult, to saw along the line of relation between the pterygoid process of the os sphenoideum and the maxillary tuberosity until reaching the spheno-maxillary fossa.

The separation of the jaw from its osseous relations being secured, as above described, the bone was wrenched from its bed by means of Lion forceps, while immediately following this a required attention was given the abundant hemorrhage.

A succeeding step was the removal of the nasal bone, which operation revealed, as inferred, extension of the disease into the ethmoidal cells. This last condition involved the taking away of the lateral box of the ethmoid, and consequently the inner lateral osseous boundary of the orbital cavity. It will be recognized that this last performance, in connection with the ablation of the orbital plate of the maxilla, left the eye fairly unsupported below and on the inside; the lachrymal bone being as well taken away.

The inferior turbinated bone was extirpated along with the maxilla.

The local carcinomatous associations being fully removed, phénol sodique was freely used by means of a syringe, while fine sponge, with strings attached to each piece, was delicately packed into all parts of the great cavity.

Dressing of the wound was completed by bringing the strings from the mouth, replacing the nasal, labial, and buccal flaps, and fixing these flaps by means of pins and stitches and by cushions of surgeon's lint laid over the face saturated with pure phénol.

Sunday afternoon signs of erysipelas showed themselves, but these yielded by the next morning through a free use of the following mixture, applied every hour by means of a brush:

℞. Tincturæ ferri chloridi	. . .	℥ ss;
Tincturæ cinchonæ	. . .	ʒ ii.;
Quiniæ sulphatis	. . . .	gr. xxx.
M.		

Tuesday morning three pins used in approximating the lips were removed, healing by first intention being so absolute that it was not easy to distinguish the line of cut.

Wednesday morning most of the stitches were removed from the face, the patient sitting in a chair during the performance.

Thursday afternoon the man walked from the ward to a sitting-room overlooking the excitements of the street, and remained with other convalescents, entertaining himself with the sights of the square for over an hour.

Friday the patient thoroughly washed his head and face in cold water, and submitted to the removal of the several packings of sponge with but little complaint.

Saturday, one week from date of operation, he walked up a flight of steps, showing himself to the assembled class, the members of which greeted him as one from the dead.

With the exception of a single thirty-grain dose of bromide of potassium, no opiate was given. From the date of operation, mouth and sponge were thoroughly cleansed and disinfected by means of dilute phénol injected through the nostril.

The case is illustrative of risks which are compelled and which may be wisely taken in the direction of oral surgery.

A few weeks since the unique operation was performed at this clinic of removing through a button-hole slit in the soft palate the whole of the body of the sphenoid bone, with the exception of the plate forming the sella turcica, an operation which, it is believed, had never previously been attempted. The necessity for the performance was an osseous tumor which had occluded the posterior nares, and which was gradually obliterating the naso-pharynx. The patient, an elderly lady from North Carolina, was able to return home, accompanied by her physician, at the end of two weeks.

Operations like the two just described demonstrate the capability lying in the surgical engine. As far as the last is concerned, no such delicate and dangerous performance could have been accomplished without its use.

Burs and revolving saws are invaluable in relation with oral operations as hemorrhage is considered. The first of the above operations would have been preceded in German surgery by the performance of a tracheotomy or the introduction and packing of a throat-tube. In the case described the only precaution taken referred

to such etherization of the patient as to preserve a required sensibility on the part of the larynx to guard against a possible blood drowning, and, as well, careful and watchful regard as to position.

PROCEEDINGS OF DENTAL SOCIETIES.

NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a regular monthly meeting May 19, 1885, at the house of Dr. Geo. S. Allan, No. 51 West Thirty-seventh street.

The president, Dr. William Jarvie, in the chair.

Incidents of Office Practice.

Dr. Bödecker. I have for quite a number of years been using a very thin layer of copper amalgam under amalgam fillings, and I have been much pleased with the results. I have spoken of it to several of the members of this society, and most of them asked me for a sample. It is called Leopold's amalgam.

President Jarvie. What is the advantage of using it?

Dr. Bödecker. I think a copper amalgam makes a much tighter filling than any other kind I have used. There is a disadvantage in the discoloration, but that is obviated to a great degree by packing other amalgam over it.

Dr. Dodge. What is its composition?

Dr. Bödecker. I believe it is only the red oxide of copper combined with mercury.

President Jarvie. The only reason you would use any other amalgam in connection with it would be to prevent the appearance of discoloration?

Dr. Bödecker. To prevent the appearance of discoloration, as well as to avoid bringing a great amount of the oxide of copper into the mouth, which has been considered by some as injurious to the system, although I have never seen any ill effects from it. I have seen in England a great many of these copper amalgam fillings, and I never heard that they caused ill health.

Dr. Davenport. I hope Dr. Bödecker will inform us what amalgam he uses in combination with the copper amalgam. Some varieties of amalgam that have been hitherto used in combination with copper amalgam have, after a few days, shown a tendency to crumble.

Dr. Bödecker. I have in combination with this copper amalgam used only two different kinds, namely, Lawrence's amalgam and

——— amalgam, which is a gold alloy, having, it is claimed, ten or fifteen per cent. of gold. I am not certain as to the proportion of gold. I have never seen any tendency to crumble, referred to by Dr. Davenport; on the contrary, all these fillings have been preserved very nicely, as far as I have seen them.

Dr. Latimer. I saw in the *Popular Science Monthly* an account of some remarks concerning copper, as to whether it was poisonous or not, and it was there stated that in some part of England—I think in Cornwall—the water of a certain creek was so impregnated with copper that it even paid to precipitate the copper from the water, and yet the people drank the water with impunity, seeming to be no less healthy on account of it.

Dr. W. H. Waite, Liverpool. In regard to the injurious effects of copper amalgam, I believe the old Sullivan amalgam was almost entirely made of copper precipitate, and a few years ago that amalgam was used to a very great extent, even by the best dentists in England, and it is still used very largely by them; yet I do not think I ever heard of any injurious effects from it upon the system.

Dr. Brockway. Has Dr. Waite observed any wasting of the fillings made of Sullivan's amalgam?

Dr. Waite. I cannot say that I have observed that. I have had a little experience with it.

Dr. Brockway. I have used Sullivan's amalgam, or cement, as it is called; also a copper amalgam prepared by Dr. Holly, the formula of which was afterwards given me by Dr. Bogue. It makes an admirable filling, as far as the preservation of the tooth is concerned. I believe there is no amalgam which makes so tight a filling, with the exception of palladium; but I have observed in several cases, especially in compound cavities, that there has been quite a noticeable wasting of the filling. I do not know whether this wasting was observable in Sullivan's cement and copper amalgams generally, or whether the fillings which I have noticed have been made from the amalgam prepared by Dr. Holly.

Dr. Dwinelle. How did the wasting manifest itself?

Dr. Brockway. Just as it is observed in oxyphosphate fillings.

President Jarvie. Leaving a smooth surface?

Dr. Brockway. Yes, and a notable loss of substance, especially in the center of the filling, and in compound cavities.

President Jarvie. Dr. Bödecker, the question has been asked whether union takes place between the copper amalgam and the Lawrence amalgam.

Dr. Bödecker. As far as I can tell, I believe there is a union, but there is very little copper amalgam used in proportion to the other; it is only placed against the walls of the cavity. I should judge there is a union between the two.

Dr. Bogue. Dr. Brockway spoke of an amalgam which he had made after a recipe which was originally furnished to us by Dr. Rodgers, of London. I will say, right here, that the difficulty Dr. Brockway speaks of, the wasting away of the amalgam, has been met with from time to time by the manufacturers who make that amalgam for sale. There was one lot made about three years ago that was very notable in regard to this wasting. Subsequently a lot was gotten out, after complaint had been made, of which I am using at present, and which does not display that wasting quality. Dr. Rodgers has in his teeth some fillings that his father put in, and that were when I last saw them twenty-two years old. I do not believe there is any union whatever between a copper amalgam and any other amalgam. I have looked for such a union and have found none. The copper amalgam that is made after Dr. Rodgers' formula is exceedingly hard and dense, and upon it I am able to build any other material I wish,—gold if I like. There is a little trick of mixing up the amalgam and squeezing out the mercury by which it may be made to set in three minutes quite hard.

Dr. Brockway. At our last meeting we had read to us a paper by one of our most earnest and pronounced members, which, from the force of circumstances, seemed to have been somewhat neglected. I refer to the paper on "Separation," by Dr. Clowes. His paper was an earnest expression of very pronounced views; and I should like to have him speak a little more definitely upon the subject. The paper advocated the idea of separation. Now, between separation and contour operations there is a vast difference, and I should like to have Dr. Clowes now give us in detail his views and methods. As I stated, his paper was in advocacy of the general idea.

Dr. Clowes. The remarks of my friend are very grateful to my ears! Coming, as they do, quite unexpectedly, and being unused myself to commendation before this society, there is something of alarm mingled with the pleasure I feel. Others have been praised here, even to adulation (and the wonder has been at their capacity to endure), but I have learned to suffer and grow strong. The snap judgment, the fierce assault, and expressive silence have kept me from the taint of luxury, and it is well. I am credited with the quality of earnestness. Truly, if anything, I am earnest, intensely earnest, in the practice and advocacy of my professional beliefs. * * *

Among the many forces that have been working during the last half of this century to advance the interests of our profession, none have been more potent and far-reaching than this society and the Dental Cosmos. We fail to realize as yet the magnitude of their achievements. Is there any advance in dental science that has not had its inception and sprung to life and been nurtured within these

bounds? Has anything appeared to bring distraction or dismay amid our ranks? The faithful here have been vigilant to perceive, to combat, and correct. In close coöperation with us the DENTAL COSMOS has filled its useful sphere, and wherever dentistry exists has borne to the intelligence of this age the products of our careful culture and ripest thought. Personally, in what I have said or done, I am happy in this, that, wherever this faithful herald and disseminator of my views has gone or shall go, my record is secure. I have had a fair showing, a just report, on its imperishable page, and I rest content.

The luxury of praise, you see, has quite drawn me away from the subject I had in mind. Separation in dentistry is a practice of so much moment that I feel its value can best be shown by referring you to my "Oral Gardening," in the DENTAL COSMOS for October, 1883.

Dr. Latimer. Will Dr. Clowes kindly state how he makes the separations?

Dr. Clowes. There is nothing difficult about them. They are as plain and simple as can be. To make them I employ the Arther disks, knife-blade and other files of various shapes; parting the teeth well except at a point of minimum contact, which I call the approximal arch. I do not make a V, but a round arch.

Dr. Brockway. A sort of U shape?

Dr. Clowes. Yes, and add to this the lingual bevel, which slopes back from the arch and widens materially in the direction of the tongue and grinding surfaces.

Dr. Brockway. In what proportion would you employ the treatment of separation?

Dr. Clowes. Almost invariably where I have reason to think danger from contact exists. To quote myself: "There is no operation in dentistry greater, grander, and more puissant for good than separation."

The following paper, by Dr. W. George Beers, Montreal, Canada, was read by the secretary:

OBSERVATIONS IN THE MOUTH DURING PREGNANCY AND THE CATAMENIA.

The observation is very familiar that during pregnancy, when the uterus is congested, the arteries distended, and the general condition plethoric, the sympathetic influence of the nervous system upon distant organs like the teeth is very marked. As the uterus enlarges there is not only abnormal pressure upon the bowels, bladder, kidneys, and ultimately the liver, but the lymphatic vessels become very large and numerous; many changes occur in the secretions of

the different glandular organs, while there is the direct abstraction of lime from the teeth and the osseous system to which I alluded in my last paper. It is not surprising that from this centre of life, besieged by an aggressive and growing fetus, conditions of a reflex nervous as well as of a purely pathological character should be present in the teeth and mouth, and that the normally sensitive salivary and mucous glands should not only have their functional activity increased, but changed in their chemical character.

It is perhaps unfair to expect general physicians as a class to interest themselves enough in the study of the mouth to make their opinions or researches undeniable. The tongue as an index of disease as well as of convalescence is too often the only thing in it most of them care to examine. It is not unreasonable, therefore, to suppose that a profession exclusively devoted to the mouth would be more accurate observers of the state of glands, which give them hourly trouble, even when in a normal condition. Indeed, the dentist ought to be a daily detective of ill-doing tonsils, uvula, fauces, and pharynx. He may often be the first to discover quinsy, the film of diphtheria, scarlatina, syphilitic ulcers, etc. He may not only see enough in time in ragged teeth to prevent cancer or other malignant diseases, but he may see enough in time to send patients to their physician for medical or surgical treatment outside of his sphere. Always looking into the mouth, he ought to know all its abnormal departures.

I am led to these remarks by the prevalent opinion among our medical authorities, that abnormal excitement of the salivary glands during pregnancy is only exceptional, and that there is no such thing deserving the name of salivation, unless the discharge is so profuse or debilitating as to be distinct and troublesome. Upon this point, which is dismissed with suggestive indifference, there is general and special agreement. Now, I venture to believe that the opportunities for observation are more favorable for dentist than physician. As a rule pregnant women do not tell the latter of their gestation until the fifth or sixth month. There are naturally cases which a dentist as such cannot know or investigate; but if he is on the *qui vive*, with the object in view of saving the woman's teeth, it is not so difficult as may at first be imagined. Every exceptional state of the salivary glands may be observed in the ordinary examination of the mouth, and observed in such a way and at such times as to distinguish the increase of saliva associated with the act of operating from abnormal secretions, with which handling the mouth has nothing to do. The numerous causes of hyper-secretion of saliva ought to be known to every dentist. It may occur during the use of certain drugs. It may even be idiosyncratical with the

use of certain foods and fruits. It may have its cause in the stomach and intestines, and some authorities believe that those two organs, as regards the liver and pancreas, hold the same relation as the mouth and salivary glands. It is often pathological, as a coincidence of acute rheumatism, in which case it is invariably acid; or of facial neuralgia, in which it is invariably alkaline, containing an excess of soda. It is associated with diabetes, small-pox, and with nearly all inflammatory affections. I have frequently observed it to begin with the very first inhalation of ether and chloroform—never under nitrous oxide gas—and remain for several days as an annoying *flux de bouche*, coincident with irritation of the pituitary or Schneiderian membrane. In cases of chronic catarrh or hay fever, ether and chloroform seem invariably to arrest the nasal discharge, and increase that from the salivary glands; and upon recovery from the effect of the anesthetic the mucous membrane of the nares is much less irritable. Hyper-secretion of saliva may be purely the effect of nervous irritation, as when excited by the sight of appetizing food; just as certain emotions will increase the secretion of milk in nursing mothers, or as exhilaration will increase the gastric secretion. Anything which excites the fifth pair of nerves, which controls the nervous system of the salivary glands, will alone excite an increased flow of saliva. But the hyper-secretion associated with pregnancy *per se* is no doubt an unconscious reflex action from the uterine mucous membrane, or *decidua*, to the salivary and mucous glands, through the medium of the sympathetic ganglia and their nerves. Upon the submaxillary gland, which is the principal one excited, the submaxillary sympathetic ganglion is situated, distributing branches to the sides of the tongue and to the submaxillary and sublingual glands. The phenomena of salivation in pregnancy seem to me to be thus explained by the physiological properties of the sympathetic ganglion, and the primary activity present in the uterine mucous membrane. For, whenever the decidua is exfoliated, as it is after birth, or in abortion, the hyper-secretion ceases in a few weeks. The point I wish to make in this connection is one contrary to what I venture to call the imperfect observation of purely medical authorities, viz., that there is in every case not diverted by febrile affections a preternatural secretion of saliva, from the early months of pregnancy to the time of lactation; and that in every case there is not only diminished alkalinity in a marked degree, but in the large majority of cases a decided acid reaction. No doubt the increased secretion often may not be sufficient to become troublesome, like recognized *ptyalism*; or it may be so abundant as to demand iodide of potassium or other constitutional treatment; but it is a hyper-secretion, nevertheless, and, having almost invariably an acid reac-

tion, no doubt explains why, with the coincident loss of lime in the tooth-structure, the teeth of pregnant women decay so rapidly. Generally this proceeds without any sponginess of the gums, but it is not uncommon to find much periosteal irritation, extending sometimes to live pulps in teeth that are not carious, causing their death; the infiltration of serum to the dentinal tubuli, and not unfrequently periodontitis of the most active character, terminating in alveolar abscess. One very remarkable ending of just such a case occurred in my own family. A pulp died in a sound superior central incisor, and decomposition followed. I am ashamed to say that I neglected the case, as shoemakers, it is said, neglect to shoe their families, and I endeavored by the use of leeches at the eleventh hour to relieve the congested state of the vessels. I know I should have opened to the pulp cavity, but one fine morning nature saved me the trouble, and had her revenge by splitting the tooth, from expansion of gas, from foramen to crown.

Now, the average hyper-secretion of saliva is not at all serious, excepting so far as the acidity is concerned; but the extreme condition is not only disastrous to the teeth, but may induce constitutional debility. I think, too, that the profuse salivation is always coincident with excessive loss of lime in the teeth, and that it not only indicates a demand for astringent or constitutional correctives, but a special alimentation, which I persist in believing to be as important at proper times for the pregnant woman as for the fetus. Idiopathic or spontaneous salivation, as a specific form of inflammation of the parotid glands, or ptyalism, induced by mercury, may be present; but that of pregnancy is easily distinguished from the latter by the absence of the coppery taste in the mouth and the mercurial fetor. In mumps we find the parotid glands enlarged and tense, and the submaxillary specially excited. In fact, any chronic disease of the salivary glands, as well as any simple inflammation, such as occurs in teething, will be associated with increased salivary discharge. The parotid has been shown by Bernard to be under the influence of the trigeminal and facial nerves, and that neuralgias of the fifth pair, and diseases of the teeth, may cause an increased flow of saliva by reflex action. Nothing is clearer to us amid the fog of doubt than that the sympathetic system of nerves controls salivary secretion. Certain nerve-centers are directly concerned in all increased secretion, from whatever cause, pregnancy included. A dentist's finger placed in the mouth stimulates the sensitive nerve-fibers beneath the epithelium of the mucous membrane of the tongue. Our operations do not excite the parotid glands any more than food; but the submaxillary and sublingual demand our watchful attention. Could we as easily and effectually

shut off the discharge from these glands as we can compress an artery, the vital force of many an operator, as well as the quality of operations, would be much improved.

Magitot has fully elaborated the etiology of the saliva and its modifications, but neither he nor any other writer I have examined has recognized hyper-secretion as an invariable sign and coincidence of pregnancy. It might not be correct nomenclature to speak of this as a pathognomonic sign of pregnancy, as pregnancy itself is purely physiological; but it is as inseparable from pregnancy as any pathological indications, such as the rash in scarlatina, the pustules in small-pox, or the characteristic signs of any other disease. Or it might be more properly mentioned as distinctly a sign of pregnancy, as the discharge of non-coagulable blood is of menstruation, though, like it, it may be more or less profuse. We can all recall instances where this condition was mistaken by eager anti-amalgamites for the salivation they fancied was caused by amalgam fillings; when it was diagnosed as such in spite of the absence of any mercurial indications, and even when the accused amalgam, which was found guilty without trial, was discovered by others to be innocent tin.

But what specially concerns us as practical men is the chemical character of this increased flow, and its effect upon the hard tissues of the teeth. I suppose few will deny but that the teeth of women are, as a rule, poorer in structure than those of men; and that at no time of a woman's life are they more predisposed to caries than during pregnancy. It would be an immense boon to humanity if we could discover how to alter those social circumstances of civilization which in our day, and especially on our continent, convert the natural into the pathological, or at least stimulate the functions of the nervous system to an intense hyperesthesia beyond their physiological endurance. I hope we shall have more and more investigation and more light upon this subject, for we sadly need it; and if we as dentists aim to save teeth, we must learn how to grow better ones, as well as to keep fairly good ones without the excavator and the plugger. I am not prepared to say that saliva from the glands during pregnancy is in every case acid; but I have been very faithful and careful in my examinations, extending back to 1868, and my opportunities for observation lead me to believe that it is most generally so. The saliva in health has always an alkaline reaction from the glands, and an acid one from the mucous follicles of the mouth. The buccal saliva furnishes all the acid requisite to produce necessary chemical changes in food for digestion. Now, it is not at all difficult to find out in every case the character of the secretions which flow from the different glands

before they become mixed. Bidder and Schmidt have studied them fully in the lower animals. The parotid saliva was obtained pure from the dog by exposing the duct of Steno and introducing into it a fine silver canula, through which it was conducted as easily as the saliva is collected from the mouth by the saliva syphon. To obtain the submaxillary saliva the canula was inserted into Wharton's duct; while the mucous was obtained pure by ligaturing the ducts of Steno and Wharton and the sublingual gland, and collecting the secretion that came from the mucous membrane. Dalton obtained the parotid saliva of the human subject by inserting into Steno's duct a silver canula one-twenty-fifth to one-twentieth of an inch in diameter, and letting the saliva run out of the mouth into a receptacle. The reaction of these four distinct fluids in almost every case of pregnancy I have examined has been of an acid character; making every allowance for causes I have mentioned, as well as for food fermentation.

In the conservative or destructive treatment of the pulp, these conditions of pregnancy are frequently obstructive, especially where nutrition is imperfect. I believe I have seen many proofs of the direct benefit derived in depraved nutrition from the previous and continued use of chemical foods, where for some reason those of nature were not assimilated, because perhaps idiosyncrasies of taste repelled them, or digestion was impaired. The pulp is a resentful monopolist, and allows no intrusion into its cavity with impunity. There are conditions of the blood in pregnancy when the tendency to inflammation is increased when it is exposed; when, also, the possibility of its preservation is diminished.

There is a frequent symptomatic odontalgia in the third or fourth month of pregnancy, owing, I suppose, to the same nervous sympathy between the uterus and the mouth that exists between the uterus and the stomach. I have often read discussions as to the propriety of extracting such teeth at such a time; but it seems to me that this is a round-about way to treat the trouble. Associated with pregnancy we have frequent migraine, facial neuralgia. These reflex actions, like the nausea and vomiting of pregnancy, are owing not to the teeth or the head, but to the uterine mucous membrane; and in extracting one tooth the pain often passes to another, unless there is such local periosteal disease as to warrant no alternative. In the ordinary "toothache of pregnancy," I remember long ago using bi-meconate of morphia, hypodermically injected over the affected tooth. Leeches would be frequently useful.

In one or two words, I may add the observation familiar to us all that during pregnancy the dentine is generally abnormally sensitive, consequent again upon that reflex action which is at the root of the

trouble we have in treating these organs at that time. Temporizing with tender touch and soft temporary fillings, carefully avoiding pain or disagreeable impressions, advising special hygienic precautions,—this ought to be all we should do.

Litmus-paper ought to be in the hands of every dentist, and ought to be used in every case at every visit of every patient, and a tabulated record kept of results. True science goes before as well as behind the merely operative. It is not enough for the permanency of our operations to know the predisposing causes of decay. It must be recognized as an unexceptional duty to know and neutralize the active agencies as well. It is very easy phonetically or otherwise to record opposite each appointment the tests of the saliva; and one important effect will be that you impress upon your patients the ease and importance of detecting these changes for themselves and counteracting their influence. The careful use of litmus-paper, by keeping it clean and dry, not allowing it to touch the lips, the mucous, or the margin of the gums, but dipping it into the mixed saliva as it accumulates, and then letting it dry upon a clean napkin —these little things are important. Tests vary in the same mouth. Often there may be no marked reaction in the ordinary run of our patients. To be faithful records, they must be made before and after meals,—in fact, at least six times a day. Intelligent patients can be taught to assist us. They ought to be taught that nature intended the saliva to preserve, not to destroy, the tissues it bathes. Instruct them in its normal and abnormal conditions; the acids, such as lactic, acetic, and oxalic, which may be formed in the gland itself or in the mouth by decomposition of food, mucous, etc.; the uric, which is caused by the retention of urine, or by disease of the kidneys, which fail to eliminate it from the blood; the acids which are the result of medicines; the conditions which are the result of disease. Again, an excess of alkali may be present, which, while not acting upon enamel, will act upon exposed dentine, and thus the normal reaction may, by its excess, become *the* exciting cause of decay.

Any special and prolonged irritation of the uterus may induce acidity of the saliva. Any serious depression of the vital powers during pregnancy unbalances the circulation, and centers the nervous force in one organ. Where there is rapid decay at this time, there must not only be a diminution of phosphate of lime, and an increase of the more soluble carbonate, but that inevitable acidity, to which two circumstances it seems reasonable to attribute the marked softening of the teeth. The pharmacist as well as the hygienist must work here hand in hand.

Just a few words now upon another condition. There are at least twelve times in each year, for about thirty years of a woman's life,

when she is abnormally sensitive to pain, and salivary changes often occur which directly affect the teeth. I refer to the menstrual period, especially in dysmenorrhea. During the early and the last months, especially with the first child, because the novelty of the occasion induces more exalted reflex action, patients who at other times bear pain well then flinch from its slightest approach. In hysteria, for instance, a woman may be unable to control herself enough to brush her hair. Each particular hair seems to stand on end, if not "like quills upon the fretful porcupine," as sensitive as if they were pulps of teeth. She may have hysterical neuralgia and toothache, and she will be sure to have hyper-sensibility of dentine and hyper-secretion of saliva. The teeth, even sound teeth, ache. A condition in the mouth exists which will disappear when the hysteria disappears, and which might be called *odontium hystericus*. It is next to impossible to excavate a cavity, or even to dry one, for such a patient. We may each of us pray that when our patients have this trouble we may be out of town.

But it is not uncommon to meet almost a similar result of menstruation. The catamenia in our modern fashionable society has an especial reflex action upon the nervous system, and associated with the coincident lassitude, pains in the back and loins, has frequently a direct effect upon diseased teeth, as well as upon the sentiveness of dentine. Everybody knows there are women who can give birth to triplets as easily as if they were rabbits, and who suffer less inconvenience during their menses than they would from epistaxis. But we have to do with the average modern woman in our cities, and so far as opportunity has been afforded me, the observation is very common that hyper-sensitiveness of dentine, increased susceptibility to pain, and hyper-secretion of saliva, which very often has the same acid reaction as in pregnancy, are almost invariably associated with the menstrual period. It is no surprise that even regular catamenia should induce some nervous reflex and sympathetic action along the ganglionic system. We know that a small ulcer on the os uteri will provoke painful micturition, and that in such slight ailments as costiveness of the bowels and foul stomach violent headache may ensue. A good deal of doubt exists among pathologists as to the true functions of the ganglia, and it may be that in menstruation, as in pregnancy, they are the centers of nervous action sympathetically conveyed to the nerves of the teeth, increasing the susceptibility to pain of the pulp and the contents of the tubuli. It may be, too, that the change in the normal character of the saliva has some active influence at this time on exposed dentine. Some day posterity may smile at our ignorance. To-day we go on bravely guessing and groping in the dark for the dawn.

During the catamenia there are many nervous patients who ought not to be operated upon. The effect of even nitrous oxide gas, unless the bladder is previously emptied, is frequently to excite unconscious micturition. It is the custom of many of us to avoid prolonged or painful operations for nervous women at this time. One of the difficulties which meets many a gray-headed dentist is to know if his patients are in the pregnant or the menstrual period. It seems absurd that even an aged dentist, who may be a great-grandfather, has not as much confidence from women in this respect as a medico who may have only passed the years of discretion when he passed his examination. What should a woman do to save her teeth? Added to the constitutional treatment necessary in special cases, a solution (one to twelve parts of water) of chlorinated soda, kept cool in a dark bottle, is one of the best antiseptics and stimulants known, and may be used as a mouth-wash after each meal, and before retiring to bed. This may be used one day, followed successively by common magnesia, or what is perhaps better, bicarbonate of soda, used in solution the same way. Frequent rubbing of the gums with the finger is alone stimulating. The badger-hair tooth-brush with chalk and soap are better than bristles and coarse powders.

But I must stop before I am told to. Before I began to write this paper I had ideas which have since vanished into thin air, and this seems only the shadow of what I intended it should be. However, the best that the most of men can do in a hurry can seldom be well done; but the best that some of us can do, even with leisure, is not as good as the worst that many here might do, even in their haste.

President Jarvie. Gentlemen, we are glad to have with us to-night Dr. W. H. Waite, of Liverpool, England. We welcome him among us, and we should be glad to hear from him at this time.

Dental Education in England.

Dr. William H. Waite. I assure you it gives me exceeding great pleasure to meet with the members of the Odontological Society of New York. My only regret in being here is that, having no idea when I left home that such an opportunity would be afforded, I brought with me no material out of which anything could be framed that would be likely to be acceptable to you. Since I have been in New York, however, I have been requested by a member of this society to give you some little information concerning the subject of dental education as it exists in England at the present time;

and I am very sorry that what I have to say to you is vague and ambiguous, for the reason that I am not thoroughly posted upon the latest changes that have taken place in the English curriculum.

Dental education in England has undergone considerable change within a comparatively short space of time. Instead of being optional and indefinite, as it was a few years ago, dependent upon the whim of the student and the circumstances of his surroundings, it is now well defined, and above all *compulsory.* That is the first point to be observed. In accordance with the provisions of the Dentists' Act of 1878, no person can now assume the title of "dentist," "dental surgeon," or the like, until he has passed through the curriculum, submitted himself to examination, and obtained a license from one of the licensing bodies of Great Britian or Ireland. The next detail of importance is that dental education is intimately associated with medical education. The dental student obtains all his instruction on general subjects along with the medical student, sitting side by side in the same class. This arrangement obviously has its merits, as well as its demerits, but it forms an important element in any description purporting to represent dental education in England. The general requirements of the English dental curriculum may be stated very roughly as follows:

1. A preliminary examination in such subjects as an ordinary lad of fourteen to sixteen would have become familiar with in a fairly good school. These examinations are conducted in the principal cities, at regular intervals, and are generally under the supervision or auspices of one or other of the universities. The examination includes the English language, history, geography, arithmetic, some mathematics, Latin, perhaps French, etc. Passing the preliminary, the student may be said to matriculate, and prove himself capable of entering upon the varied and special avenues of study necessary for his future career.

2. The next item of a general character is attendance upon certain courses of lectures,—anatomy, physiology, chemistry, materia medica, etc., which he takes at some recognized medical school; the time required for these being from two to three years.

3. Then we come to the more interesting special requirements, viz., a period of pupilage with some practitioner supposed to be devoted chiefly to instruction in mechanical work. How much of this is actually necessary I am not prepared to say. The indefinite quantity just here appears to be perhaps the principal weakness of the English system, according as it may be viewed from differing stand-points.

4. Attendance at a recognized dental hospital is required for two

years, during which the student has the opportunity of instruction and practice in operative dentistry. The facilities afforded in the several dental hospitals vary considerably, but the London hospitals have developed a very perfect system of instruction, and are turning out some exceedingly skillful and well-posted operators.

5. Closely connected with hospital practice are the special courses of lectures on dental surgery, dental histology, dental mechanics, metallurgy, etc. These are chiefly afforded in connection with medical schools, though the lecturers are often dental practitioners. Full courses of these special subjects are indispensable, and for the most part the lectures are well adapted to the equipment of those who propose to devote themselves to dental practice.

Taken as a whole, it would be safe to say that the requirements of a sound and complete dental education, so far as head knowledge is concerned, are furnished by the English curricula as fully as, if not more thoroughly than, by any other system at present in existence. If the dental student serves an average term of apprenticeship, and if he faithfully fulfills all the details of his curriculum, both general and special, he will probably have to spend more time, labor, and money in his training than that demanded from the student who is preparing for general medical practice. In other words, the candidate for the "License in Dental Surgery" will have to invest more capital in his preparatory studies than the man who desires to possess the full "Membership of the College of Surgeons," which entitles him to follow general practice.

We are stating the facts in a general sense, and not discussing minute details, or criticising the merits of the system, although, were we doing the latter, it might be quite easy to question the need for so much mental exercise on the part of those whose future career is to be so largely occupied with practical, and, in a sense, mechanical duties. There is not implied by this last remark any depreciation of the value or advantage of a well-furnished upper chamber, but a simple question as to what is properly and absolutely *essential* for the education of a dentist.

Turning to the examination of dental students, as at present pursued on the other side of the Atlantic, we find that it consists of two parts, viz., written answers to certain printed questions, and a *viva voce* process, carried on by three surgeons or physicians upon general subjects, and three dentists on special topics. The questions asked, for the most part, are thorough, honest, and clear,—just such as would plainly discover the intellectual whereabouts of the candidate,—but the paucity of practical tests in connection with the examinations is a deficiency that is it difficult to view without regret. It is quite true that it is possible to watch students, and

so form a tolerably correct opinion of their skill, as they pass along their course; but, if examination is the test by which they are to be adjudged fit or unfit for professional duties, then we claim that examinations in dentistry should certainly include some practical exercises, both in operative and mechanical work. I believe that the Royal College of Surgeons in Ireland has indicated some recognition of this necessity. Their proposed curriculum provides for a more definite practical instruction than either of the licensing bodies in England or Scotland has hitherto attempted. I am not able to state positively the exact details of this difference, but it relates to a more perfect instruction from the dental stand-point.

Now, it may be supposed that one should give utterance to some opinion concerning the intimate association of dental and medical education and its results upon the dental student. So far as the acquirement of general knowledge goes, probably the connection of the two works advantageously. So far as *special* instruction is concerned, I am of opinion that it would receive great impetus, and be more rapidly developed, if it were universally distinct and separate from the medical schools. The dental profession is surely something more than a mere appendage to the medical profession; and dental practitioners ought to be surely better competent to instruct dental students than general practitioners are likely to be; beyond all which there is a further consideration, viz., that the necessity for dental instructors would prove a powerful stimulant to dental investigation and research. This criticism, however, is by the way. We recognize advantages, and record progress, apart from personal opinion or professional pride. And, moreover, we believe that by-and-by the demands of dental education will necessitate the increase of dental schools, where complete provision shall be made for equipping the dental student for his battle of professional life.

Dental education in England to-day furnishes opportunity for the most entire and systematic impartation of knowledge. There is no curriculum more complete or comprehensive so far as mental studies go. Given a student who is disposed to learn, and he will find every opportunity of becoming well informed, while the fact that he is examined by officials unconnected with the schools (except in their capacity as *examiners*) affords a fair guarantee that if he obtains his license he is positively worthy to hold it.

Now, gentlemen, let me turn the tables for a moment, and let me premise that I am greatly prepossessed in favor of the American system of dental education. I think you are on the right track in maintaining your independent and distinct position. I should be sorry to see that position abandoned. I think you have developed methods of instruction that are simply wonderful in their adaptation to the actual

needs of the dental student. Your practical instruction is beyond all comparison, particularly in regard to the treatment of dental disease, and all the varied operations required from the dental practitioner. If my son should elect to follow the profession of his father, I could desire nothing better for him in the department of practical instruction than that he should go through two full courses at one of your best dental colleges. That is the highest praise I can give to American dental education. I have been particularly interested and delighted to find that the several faculties of dental colleges have determined to require a preliminary examination from all students in time to come. The absence of such an examination has been for some time a weak point in your system, and I desire to congratulate my American brethren upon the advance thus made. Moreover, it is very gratifying to know that the "five years'" practice clause has now been abandoned by common consent. That provision has served a very useful purpose in the past, but the need for it no longer exists. For the sake of the reputation of American dentistry, I am rejoiced at both these improvements. There is, however, one stricture which possibly you will permit me to make. It seems to me the one thing now necessary to elevate the "D.D.S." to its legitimate position, and set it free from all reproach. I refer to the method of examination. The details of examination are most satisfactory. The practical tests especially are invaluable. They are just the features lacking in our English system at present. But is it not very desirable that the examiners should be an *independent* and *distinct* body? Would it not be possible to have an examining board for all the dental colleges, and would some such arrangement not prove beneficial alike to the colleges and the public? You will take this suggestion for what it is worth.

The general subject of dental education is the same, wherever it is considered, and by whomsoever it may be discussed. It embraces two distinct but absolute necessities, *knowledge* and *skill.* Both are *essentials;* neither can be dispensed with, if the education is to be complete. It would indeed be hard to say which of the two would produce the greatest anomaly,—knowledge without skill, or skill without knowledge. If there should arise any disposition to magnify one at the expense of the other, certain disaster must inevitably follow. The dentist is a man who should be able to diagnose, to differentiate, and to treat every lesion that shall present itself in connection with the dental organs. All the knowledge he can possibly acquire will prove comparatively useless to him unless he is competent to put it into operation; hence we regard a thorough training in mechanics as the first essential of a dentist's education,—

for this additional reason, that manipulative freedom and skill can be best acquired in the early periods. Moreover, we might go so far as to say that, unless a man has some mechanical *genius*, or at any rate a taste for mechanical work, he is hardly likely to make very much headway in the practice of dentistry. It has been urged that a dentist should be able to make his own instruments. Well, so much the better for him if he can do so; certainly he should be able to modify them if desired; but what we contend for is that, without a good practical discipline in mechanics, it is very improbable that a man can become a skillful dental operator. Familiarity with mechanical laws and a good idea of mechanical forces do not, it is true, make a man a dentist; but, on the other hand, you cannot make a good dentist of a man who is ignorant of these things. There is perhaps a danger, particularly in some quarters. There may be some who affect to despise mechanical work. There may be others who think they will never need to construct an artificial denture, and from these and other points of view it may appear superfluous to insist upon a mechanical training; but I question if any man can be found who has practiced dentistry for twenty-five years to any extent who will not acknowledge this necessity, and desire to see it recognized in any system of dental education in which he may be interested. Perhaps there is at the present time little danger in the department of professional knowledge. The curricula at home and abroad comprise every topic that can be held needful. To this generation, more markedly than to any previous, belongs the honor and satisfaction of perfecting and bringing into prominence the necessity and the facility for thorough dental education.

[Dr. Waite then exhibited some specimens of "Prehistoric Dentistry," which he had procured on loan from the directors of the Brown Museum, in Liverpool, *specially* to show to some of the American dental societies. Referring to them, Dr. Waite said:]

These specimens of so-called prehistoric dentistry are exceedingly interesting, but I am very sorry that I have nothing definite to say to you about them. I had them with me the other day at the meeting of the New York State Dental Society, at Albany, and after I had presented them a gentleman who is better informed on the subject than I am, the accomplished editor of the *Independent Practitioner*, called attention to the fact that in that journal there appeared, in the month of January, a paper from Dr. Van Marter, of Rome, describing some specimens, which he had recently seen, of what he called prehistoric dentistry. Immediately after that paper was published a gentleman (I think it was Dr. Cryer, of Philadelphia) wrote to the editor of the *Independent Practitioner* that he had

heard at some time that there were specimens of a similar character in a museum at Liverpool. Dr. Barrett immediately wrote to me, asking me to seek out these specimens. I went to the museum we have in Liverpool, and I found there two of these specimens, so similar to those described by Dr. Van Marter that it was hardly necessary to give any other description of them. I sent an account of them to Dr. Barrett, which appeared in the April number of the *Independent Practitioner*. Later on I wrote to the curator of the museum asking him if he could give me any detailed information in connection with these specimens, and in reply he said that they had belonged originally to what is known as the Mayer collection,—a large collection of antiquities made by a gentleman of that name, who devoted the whole of his leisure to researches and travels in connection with matters of antiquity. There is in this museum a piece of paper in Mr. Mayer's hand-writing, in which he says that these specimens came into his possession in the year 1857, and that they are supposed to have been found in an Etruscan grave. At the period to which these things are supposed to belong it was the custom to cremate the dead, and only the nobles and princes were buried in the usual manner. They, however, were embalmed and buried in large chambers, generally in the garden of the palace or house in which they lived, and these chambers were domed over, and upon them there was a considerable building erected as a mausoleum. It was in the garden of one of these palaces, I believe, that the specimens were found which Dr. Van Marter describes in the January number of the *Independent Practitioner*. That is all the history there is about it. It is impossible to confirm these statements. The specimens belong to a period of which we have no authentic records; but I know enough of the reputation of Mr. Mayer to be quite certain that whatever he wrote touching these specimens was true to the best of his knowledge and belief. Whatever record respecting them could be obtained he would be sure to obtain before he made any statement touching them.

A motion that the thanks of this society be returned to Dr. Waite for his kind attendance and interesting contribution this evening, and through him to the museum in Liverpool that has permitted him to bring these specimens for exhibition to us, was carried unanimously. Meeting adjourned.

E. T. Payne, D.D.S., *Secretary*.

SOUTHERN DENTAL ASSOCIATION—SEVENTEENTH ANNUAL SESSION.

(Concluded from page 401.)

Third Day.

The day was devoted to a visit to the Exposition, as guests of the dentists and dealers in dental supplies of New Orleans. The members of the association, with their families and friends to the number of nearly three hundred, met at Tulane Hall and marched to the foot of Canal street, where the steamer Clinton was waiting to convey them to the Exposition grounds. Arrived at the grounds, the party gathered under the largest of the giant live-oaks in the grove and were photographed. Thence they proceeded to Music Hall in the Main Building, where they were formally welcomed by Dr. A. G. Friederichs in an eloquent address. The speaker indulged the hope that their guests would find a "hospitality as warm and bright as our sunny shores, and that the remembrance of your sojourn here may linger with you in after years, and ever be as fragrant as the flowers of our own well-beloved south-land." Capt. S. H. Buck, acting director-general of the Exposition, followed with a few remarks, cordially welcoming the assembled dentists to the Exposition. Dr. A. O. Rawls, president of the Southern Dental Association, replied, expressing the thanks of members of the association for the generous hospitality which had been tendered to them. Dr. Rawls was followed by Col. F. C. Morehead, commissioner general of the Exposition, who, in a few well-chosen words, echoed the welcome uttered by Capt. Buck.

The formal ceremonies of Dentists' Day being concluded, a special drill of the Life-Saving Service was held for the benefit of the dentists, who then proceeded to discuss a fine collation which had been prepared for them; after which the remainder of the day was spent in sight-seeing among the wonders of the Exposition.

Fourth Day.

The morning was devoted to clinics, by Drs. E. Parmly Brown, W. G. A. Bonwill, and others.

Afternoon Session.

Dr. McKellops announced that the following new preparations and appliances had been offered for inspection: Robinson's gold-lined plate; Kells's bottle-top; Lambert's Listerine and mentholated camphor; McKesson & Robbins's cocaïne; Westmoreland's articulator; Talbot's regulating apparatus; Miles's mouth-piece for nitrous-oxide inhalation; Smith's thickened-rim sand-paper disks; Edwards's new method of making thin rubber plates; Bonwill engine; Mason's burs,

made to cut from the operator; Williams's lathe-head; Byrnes's method of regulating;* and the Coffin split plate for regulating. Dr. Morrison showed also some very curious specimens of Japanese dentistry, and gave some account of Japanese methods.

Adjourned.

Evening Session.

The Committee on Dental Literature was called, and Drs. B. H. Catching and E. S. Chisholm read papers.

Following is the substance of Dr. Catching's paper:

The literature of a profession gives reputation to that profession, and is the only true index of merit. It is a perpetual teacher, never graduating its pupils, but constantly adding to the course. He who lays down his text-books with the idea that his education is finished makes a fearful mistake. A few years back professional illiteracy was perhaps the rule, for text-books were few and journals scarce, but now literature of the highest character is within the reach of all. Standard works on nearly every subject are before us, some of recent date that bid fair to increase interest in a field which has been too much neglected and one the cultivation of which is of great importance,—materia medica and therapeutics. The profession at large is lamentably ignorant on these subjects. Creasote, carbolic acid, and tannin is the sum-total of the attainments of the average dentist in this direction. He is not altogether to blame. The means for acquiring broader information was not placed before him. The literature of this topic was not of an inviting kind. The colleges failed to instruct, preferring rather to let students show their handiwork as artisans than their ability as therapeutists. It were better to be practical alone than theoretical alone, but through neither by itself can the highest destiny be attained. Its literature is the very soul of a profession. With all that has been done we are not yet where we should be. While the current news of yesterday comes to us from the furthest corners of the earth, in the literature of professional science we are too slow. We need a weekly medium of communication, and its coming is inevitable.

Dr. Chisholm's paper was, in brief, as follows:

The literature of the learned professions to-day is mainly in the periodical form. There is, perhaps, not a subject in the whole range of dentistry which has not received more or less attention in its journals. As fast as a new invention or idea is evolved it finds a place in our periodicals. In our journalistic writings we can boast a

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* This method will be explained with illustrations in the DENTAL COSMOS for September.

distinctive literature, but among our text-books much that we claim as ours is borrowed from our neighbors. Although borrowing from medicine that which she can give without injury to herself, we return the loan with usury. There is no scarcity of reading matter in the dental profession. Twenty-one journals, giving from 600 to 1000 pages of reading matter per month, are devoted exclusively to dentistry, besides the transactions published by many of the leading associations; and within the last four years alone some eighteen volumes have been added to our standard literature, each of which deserves a place in every library. The bitterest complaints are made against our periodicals because of the advertisements which accompany them, but to the man who keeps pace with his business these will be no objection, because they acquaint him with the latest materials offered and the newest inventions and improvements. It is thus important to the publishers that their journals shall be worthy of an extended patronage. What we most need now is not more writing, but better writing. The great difficulty is that the raw material entering our ranks is without preliminary education. The threshold of the profession needs to be guarded against the entrance of ignorant young men whose highest ambition is to make a living, as they think, without work. From such we cannot expect respectable professional attainments, much less good contributions to our literature.

Dr. Spalding. It goes without saying that every profession is measured by its literature. As has been said by Dr. Chisholm, our periodical literature is sufficient for our needs in quantity, though lacking in quality, but its management is in good hands, and we may look for progress. Our standard literature seems to be in very defective hands, and it may be useful to examine into the matter to see why this is so. Dr. Catching has said that the standard literature of our therapeutics and materia medica is almost barren. Why is it that some departments have grown beyond measure while others have produced almost nothing? If we examine our text-books we will find that they are written by teachers, and that those departments whose literature is scanty have depended almost altogether on medical authors. How little these know of the application of remedies to dentistry their books demonstrate. They have almost no knowledge on the subject. How, then, can they be expected to teach well? To overcome this difficulty we must bring forward men from our own ranks, who know practically the application of remedies in dental practice and the results, to teach these branches and write our text-books. He looked forward confidently to the day when every teacher in the dental schools shall be a practical dentist. It has been said that physiology, anatomy, etc., are sciences, and that

they are applicable to all branches of the healing art. This is true in theory, but not true in fact. No man becomes complete master of a subject unless he expects to teach it. Study of these branches, to be effective, should be directed to usefulness in practice. The average dentist cannot become a complete master of them, and he must therefore learn what will be useful to him. Medical men are not familiar with the pathology and therapeutics of the teeth, or with dental materia medica, and they are therefore incapable of teaching these branches properly.

Dr. Catching has observed in his attendance on dental societies that everything that is brought there to be shown is on the practical side of dentistry, with not a single literary work. He would like to see the publishers send a copy of each book relating to dentistry to the society meetings for examination.

Dr. Taft. A look back over the periodicals and books of the last forty years will show almost marvelous progress. We have a habit of saying that our literary standard should be higher; so it should. Every year witnesses new men wielding the pen, some of them wielding a strong pen. There is much to encourage us in this respect, and if we don't scold too much, but hold straight on the way and do what we may, our periodical literature will be equal to that of any other department of human occupation. If the discrimination in the taking of students alluded to by Dr. Chisholm in his paper be practiced we shall have a race of writers. Young men should be encouraged to engage in this part of the work of the profession. Some of the schools make writing—the preparation of papers—a part of the college work. If all were to pursue this course, it certainly would be the cause of much improvement. Reference has been made to the lack of improvement in our standard works. Let him who can improve upon them do so. There is always room for better work. The standard works and the articles in the journals are mostly written for those already in the profession. We have no elementary books. This is a need of the profession perhaps more imperative now than in the past. The medical profession is just as badly off. If we can take a step in this direction, we shall achieve what has not yet been done. He had no suggestion to make as to the means for the introduction of such books; but that there should be elementary works on dental subjects is certain. Some of the common-school text-books of physiology are much better than those usually put into the hands of dental students for instruction in the elements of the science. The nomenclature of anatomy, some of that pertaining to physiology, and much of that belonging to pathology, is an outrage on students, who find the need of a knowledge of two or three languages to comprehend the terms. Give them

English names, and how much more easily the students will get along.

With regard to the periodical literature, most of the journals contain much advertising matter, of which complaint is made in some quarters. He could see nothing against the admission of advertisements. If a subscriber is to receive 48 pages of reading matter a month and gets it, it does not hurt him if 500 pages of advertisements are thrown in. Many turn to the advertisements the first thing, and many will be found who can tell what is advertised in their journal who do not know what is in the reading pages. It shows that the advertisements are of interest to the dentist. Some of the journals are so much on stilts that they refuse to mention appliances in their editorial pages. He thinks the true editor should give his opinion of these. It is the only way many have to get a fair idea of them. In the advertisements, as we all know, everything is the best that was ever made for this particular purpose. Another thing: were it not for the proceeds of the advertising pages the publishers could not support their journals as they do.

Dr. Patrick thought that Dr. Taft, in advocating "anatomy made easy," and "physiology made easy," must have forgotten that the high schools teach these, and a man who has not been through a high school has no business to take the responsibility of the study of dentistry upon him. Gray's is the only anatomy that stands good all over the world. It has not an unnecessary word, and he does not see how any man can fail to understand it. The elementary principles of these subjects are now taught in the common schools, and dentists will find children who will take issue with them on points connected with one or the other, and give their teachers as authority.

Dr. Walker thought that hygiene should be added to the list of studies proposed by Dr. Taft for school children. One of the crying evils of the day is a lack of primary education in the principles of the laws of health.

Dr. Salomon was surprised at Dr. Chisholm's attacks on American dental literature. When the speaker came here in 1867 he thought he knew a good deal about dentistry because he had studied in Berlin, but he found he had to begin over again. The German periodicals have few advertisements, it is true, but the American journals contain much more valuable, practical matter to the dentist. We ought to be thankful that we have so good a literature.

Dr. Chisholm replied that Dr. Salomon had misunderstood him. He had taken exactly the same position—he deprecated attacks on the journals because of the advertisements they carried. Our litera-

ture is the evolution of the times, and improvements will come as we need them. The only thing we can do to advance our interests in this direction is to take into the ranks only educated men. This could not be controlled in the early days, but now the time is coming when it can be.

Dr. Taft said that in his remarks he simply reiterated what has been said before. We know that as a fact a majority of those who become students of dentistry have not studied anatomy in the high schools, and the knowledge of those who have is of the most elementary description, and of no value in entering the profession. We should have graded books. As to the foreign journals, they do have a great deal that is valuable. We are indebted to them for much of our science.

Dr. Spalding, as an illustration of what he had advocated, that medical men know nothing of dental anatomy, and are therefore not fitted to teach it, referred to Gray's "Anatomy," which has been quoted here as authoritative the world over. If you will turn to the pages devoted to dental anatomy, you will find there the views of Goodsir, which were announced before the means of studying dental anatomy were discovered. A very large part of the chapter is wholly erroneous, and it is not true at all. Now, are we to wait till some medical man chooses to study the histology, the history, and the anatomy of the teeth, and then writes a book for us?

Dr. Patrick. Gray's "Anatomy" is a text-book, an elementary treatise for the general medical practitioner. It is not to be expected that it will serve as a guide for any specialist. Carabelli wrote, fifty years ago, an excellent treatise on the teeth, but his name is rarely mentioned. Greater still is Richard Owen's treatise. We are not lacking in text-books for professional men.

Dr. Harlan said it had occurred to him, while listening to the remarks that have been made, that the members of the dental profession are not mere boys beginning to learn the rudiments of their studies. The trouble is not lack of text-books, but lack of reading,—failure to study those we have. The great lack of the books is that they are too truly elementary; and another trouble is that too many, when they have read the primer, think they know it all. He does not believe that the profession can be built up by the aid of primers. Some who read them get a smattering of knowledge and put forth their insignificant ideas founded on such knowledge as men of science, when they are but the merest troglodytes. Have we not Tomes's and Sewill's "Anatomys," and several dental materia medicas? But the great trouble is that as a class we do not read. Too many get an edition of a work of say 1865, and when a later comes out never buy it. If they would get the new editions as they

come out and study them they could be instructive to younger men who come to society meetings to learn.

Dr. Taft disclaimed any reference to the kind of books to which Dr. Harlan had objected. These "primers," so called, are not for beginners. Gray's book is a magnificent work, but it was not written under the light of histological knowledge as it stands to-day. If it was it would be much different from what it is, not only in dentistry, but in other directions also. He thought it would be a good idea for the Committee on Dental Literature to bring to the next meeting of this body a copy of each of the books published within the year, and copies of the various journals. That would be the best kind of a report on the subject.

Dr. Teague thought some notice should be taken by the association of the little work of Mrs. M. W. J., which has certainly filled a long-felt want. He moved the thanks of the association to the authoress.

Dr. Taft moved to amend by recommending it to all practicing dentists for circulation among their patrons.

The motion as amended was adopted.

The subject was passed.

Dr. McKellops desired to call attention to violations of the Code of Ethics, especially Section 3, Article II., which he read. Those now present who were also members of the American Dental Association would remember that, at the meeting of that association at Boston, the speaker had introduced a series of resolutions condemning the giving of certificates by dentists concerning preparations of the composition of which they are ignorant. This is a subject to which apparently a good many do not pay much attention. Many cut out from prints certificates by prominent dentists, of different preparations, and use these advertisements to call the attention of their patrons to them. He held in his hand at that moment a printed advertisement of a mouth-wash, to which were appended some wonderful certificates. He thought that we were not doing ourselves justice when we commended a preparation which we didn't know anything about. If anyone can tell what is in this preparation, and if it is as good as these certificates would seem to indicate, he wanted to use it. He proposed to have it analyzed, and to see if he can what it is that gives it its virtue. He had been fighting this matter of giving certificates to secret preparations a good many years, and it pained him to find the names of men whom he respected appended to them. It would be much better to attend the meetings of this association than to sign such certificates.

The annual election was then held, the result of which has already been printed.

Dr. Wardlaw, the newly-elected president, and the other officers were duly installed.

Mrs. M. W. J. was elected an honorary member of the association.

The thanks of the association were voted to the board of management, the trustees, and the faculty of Tulane University for the use of their hall; to Mr. J. W. Selby (of The S. S. White Dental Mfg. Co.) for the use of chairs for the clinics, etc.; to the retiring officers, and to the dentists and dealers in dental supplies of New Orleans, for their generous entertainment of the members of the association. A resolution of sympathy with Dr. Geo. J. Friedrichs, a member of the association, in his recent painful affliction, was also adopted.

The association adjourned to meet in Nashville, the fourth Tuesday in May, 1886.

NORTH CAROLINA STATE DENTAL ASSOCIATION AND BOARD OF EXAMINERS.

The eleventh annual meeting of the North Carolina State Dental Association was held in Charlotte, N. C., June 2, 3, and 4, 1885, and much business of importance was transacted. The officers elected for the ensuing year were: J. E. Matthews, president; B. H. Douglass, first vice-president; H. C. Herring, second vice-president; T M. Hunter, secretary; J. W. Hunter, treasurer.

The Board of State Dental Examiners held their annual meeting at the same place, June 2, 1885, all the members being present. The following names compose the members of the board: V. E. Turner, chairman; J. F. Griffith, secretary; J. W. Hunter, E. L. Hunter, J. E. Matthews, and J. H. Durham.

The State Dental Society and Board of State Dental Examiners will hold their next annual meeting in Raleigh, beginning on the first Tuesday in June, 1886.

THOMAS M. HUNTER, *Secretary*, Fayetteville, N. C.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

At the annual meeting of the Dental Society of the State of New York, held at Albany, May 13 and 14, 1885, the following officers were elected for the ensuing year:

Frank B. Darby, president; G. C. Daboll, vice-president; J. Edw. Line, secretary; H. G. Mirick, treasurer; Wm. H. Atkinson, correspondent. Censors: First district, Wm. Carr, vice N. W. Kingsley; Third district, S. D. French, re-elected.

On recommendation of the Board of Censors, the degree of M.D.S.

was conferred upon Charles S. Ives, of New York; B. A. R. Ottalengui, of Brooklyn; and E. J. Taylor, of Syracuse.

Delegate certificates will be issued to members who desire them for use at the coming meeting of the American Dental Association, on application to the secretary.

J. EDW. LINE, *Secretary*,
Rochester, N. Y.

FLORIDA STATE DENTAL ASSOCIATION.

The annual meeting of the Florida State Dental Association convened in Tampa, May 5, 1885.

The following officers were elected for the ensuing year: Duff Post, president; H. M. Granniss, first vice-president; J. N. Jones, second vice-president; J. D. Cromwell, corresponding secretary; J. A. Giddens, recording secretary; Jas. Chase, treasurer. The Executive Committee is as follows: B. T. Cowart, chairman; H. M. Granniss, L. M. Frink, J. D. Cromwell, and C. F. Kemp.

J. A. GIDDENS, *Recording Secretary*.
Tampa, Fla.

MINNEAPOLIS DENTAL SOCIETY.

The Minneapolis Dental Society held its annual meeting June 17, 1885, at the office of Dr. E. F. Clark, Minneapolis, Minn.

The following officers were elected for the ensuing year: W. A. Spaulding, president; E. B. Dillingham, vice-president; M. G. Jenison, secretary; and E. H. Angle, treasurer.

CENTRAL ILLINOIS DENTAL SOCIETY.

The fourth annual meeting of the Central Illinois Dental Society will be held in Bloomington, Ill., commencing on the second Tuesday in October, 1885, the sessions continuing for three days.

C. R. TAYLOR, *Secretary*,
Streator, Ill.

BRITISH DENTAL ASSOCIATION.

The annual general meeting of the British Dental Association will take place on Thursday, Friday, and Saturday, the 26th, 27th, and 28th of August, 1885, in the University town of Cambridge, England.

We anticipate that the regular proceedings will be of considerable interest, and arrangements have been made for social entertainments which promise to be very successful. The annual Dinner will be held in one of the college halls, and there will be one or two garden

parties in the grounds of the colleges, a *conversazione*, and probably a water-party on the river.

The town of Cambridge has many attractions, and the Local Committee will be glad to find sleeping accommodation for any professional brethren who may cross the seas and care to spend a few nights in college.

Through the pages of the DENTAL COSMOS we extend a hearty invitation to American dentists who may be visiting Europe to attend. The Local Committee consists of all the practitioners in Cambridge.

GEO. CUNNINGHAM, D.M.D.,
W. A. RHODES, L.D.S.I.,
Hon. Secretaries.

NORTHWESTERN DENTAL ASSOCIATION.

The third annual meeting of the Northwestern Dental Association will be held at Fargo, Dakota, commencing Friday, August 7, 1885, the sessions to continue for two days.

The Territorial Board of Examiners will meet in special session if there should be any applicants for examination.

Members and dentists attending the meetings of the Minnesota State Dental Society and American Dental Association are cordially invited to attend our meeting, Saturday, August 8, the next day after the American Dental Association closes in Minneapolis.

S. J. HILL, *Secretary*,
Fargo, Dakota.

HARVARD UNIVERSITY—DENTAL DEPARTMENT.

At the annual commencement of Harvard University, held June 24, 1885, the following named students were graduated from the Dental Department:

Charles Henry Abbot,
Edward Merrill Currier, M.D.,
Charles Eugene Estabrook,
Thomas James Giblin,
Henry Webster Gillett,
Walter Harrison, L.D. S.,
William Henry Potter, A.B.,
James Shepherd.

EDITORIAL.

CALIFORNIA DENTAL LAW.

The following is the text of "an act to insure the better education of practitioners of dental surgery and to regulate the practice of dentistry in the State of California:"

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall be unlawful for any person who is not at the time of the passage of this act engaged in the practice of dentistry in this State to commence

such practice, unless he or she shall have obtained a certificate as hereinafter provided.

SEC. 2. A Board of Examiners, to consist of seven practicing dentists, is hereby created, whose duty it shall be to carry out the purposes and enforce the provisions of this act. The members of said board shall be appointed by the Governor from the dental profession of the State at large. The term for which the members of said board shall hold their offices shall be four years, except that two of the members of the board, first to be appointed under this act, shall hold their office for the term of one year, two for the term of two years, two for the term of three years, and one for the term of four years, respectively, and until their successors shall be duly appointed and qualified. In case of a vacancy occurring in said board, such vacancy shall be filled by the Governor in conformity with this section.

SEC. 3. Said board shall choose one of its members president and one the secretary thereof, and it shall meet at least once in each year, and as much oftener and at such times and places as it may deem necessary. A majority of said board shall at all times constitute a quorum, and the proceedings thereof shall at all reasonable times be open to public inspection.

SEC. 4. Within six months from the time that this act takes effect it shall be the duty of every person who is now engaged in the practice of dentistry in this State to cause his or her name and residence or place of business to be registered with said Board of Examiners, who shall keep a book for that purpose. The statement of every such person shall be verified under oath before a notary public or justice of the peace in such manner as may be prescribed by the Board of Examiners. Every person who shall so register with said board as a practitioner of dentistry shall receive a certificate to that effect, and may continue to practice as such without incurring any of the liabilities or penalties provided in this act, and shall pay to the Board of Examiners for such registration a fee of one dollar. It shall be the duty of the Board of Examiners to forward to the county clerk of each county in the State a certified list of the names of all persons residing in his county who have registered in accordance with the provisions of this act, and it shall be the duty of all county clerks to register such names in a book to be kept for that purpose.

SEC. 5. Any and all persons who shall so desire may appear before said board at any of its regular meetings and be examined with reference to their knowledge and skill in dental surgery, and if the examination of any such person or persons shall prove satisfactory to said board, the Board of Examiners shall issue to such persons as they shall find to possess the requisite qualifications a certificate to that effect, in accordance with the provisions of this act. Said board shall also indorse as satisfactory diplomas from any reputable dental college, when satisfied of the character of such institution, upon the holder furnishing evidence satisfactory to the board of his or her right to the same, and shall issue certificates to that effect within ten days thereafter. All certificates issued by said board shall be signed by its officers, and such certificates shall be prima facie evidence of the right of the holder to practice dentistry in the State of California.

SEC. 6. Any person who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction, may be fined not less than fifty dollars nor more than two hundred dollars, or confined six months in the county jail, for each and every offense. All fines recovered under this act shall be paid into the common-school fund of the county in which such conviction takes place.

Sec. 7. In order to provide the means for carrying out and maintaining the provisions of this act, the said Board of Examiners shall charge each person applying to or appearing before them for examination for a certificate of qualifications a fee of ten dollars, which fee shall in no case be returned, and out of the funds coming into possession of the board from the fees so charged, and penalties received under the provisions of this act, all legitimate and necessary expenses incurred in attending the meetings of said board shall be paid. And no part of the expenses of the board shall ever be paid out of the State treasury. All moneys received in excess of expense, above provided for, shall be held by the secretary of said board as a special fund for meeting the expenses of said board, and carrying out the provisions of this act, he giving such bonds as the board shall from time to time direct. And said board shall make an annual report of its proceedings to the Governor, by the first of December of each year, together with an account of all moneys received and disbursed by them pursuant to this act.

Sec. 8. Any person who shall receive a certificate from said board to practice dentistry shall cause his or her certificate to be registered with the county clerk of the county in which such person may reside, and the county clerk shall charge for registering such certificate a fee of one dollar. Any failure, neglect, or refusal on the part of any person holding such certificate to register the same with the county clerk as above directed, for a period of six months, shall work a forfeiture of the certificate, and no certificate, when once forfeited, shall be restored, except upon the payment to the said Board of Examiners of the sum of twenty-five dollars, as a penalty for such neglect, failure, or refusal.

Sec. 9. Any person who shall knowingly and falsely claim or pretend to have or hold a certificate of license, diploma, or degree, granted by any society organized under and pursuant to the provisions of this act, or who shall falsely and with intent to deceive the public, claim or pretend to be a graduate from any incorporated dental college, shall be deemed guilty of a misdemeanor, and shall be liable to the same penalty as provided in section six.

Sec. 10. Nothing in this act shall be so construed as to prohibit any practicing physician from extracting teeth.

Sec. 11. This act shall take effect immediately.

The act was approved March 12, 1885, and the following Board of Examiners was appointed by the Governor: S. W. Dennis, M.D., D.D.S., president, San Francisco; E. W. Biddle, Healdsburg; J. W. Hollingsworth, Los Angeles; Thomas Morffew, D.D.S., San Francisco; S. S. Southworth, Sacramento; M. J. Sullivan, D.D.S., San Francisco; and Charles W. Hibbard, D.D.S, secretary, San Francisco.

BIBLIOGRAPHICAL.

Das Füllen der Zahne mit Gold, etc., nach Deutscher Methode. Von Wilhelm Herbst, Zahnarzt in Bremen. Verlag Von C. Ash & Sons, Berlin, 1885.

This work of 43 pages is the full statement of the mode of procedure in filling after the "German method," of which the author is the originator. He devotes, in the preface, considerable space to

thanking his many friends and co-workers in Germany and foreign lands, and believes that no parallel can be drawn between his method of "rotation," which he calls the "German," and that which is called the "American." He closes this preface by stating his general conclusions as to the value of the process: "I claim to-day for our German method, in opposition to the American, the following advantages: You can work with equal facility by the latter in execution of the work, and from two to three times as fast. You shorten, therefore, in equal proportion the pain of the operation to the patient. You remove opposition to proceeding with diseased teeth, to the concussion of the mallet blow, and the filling from that time on becomes wholly painless. You save to dentists more than half the time and the nerve-straining work. These results are well worth consideration."

The author then takes up the instruments for rotation and those used for the same process under hand-pressure or hand-rotation. This latter seems to be a modification of the original plan.

The results of operations in cavities in steel plates is next considered, in which he endeavors to prove that the worth of a filling is in the close adherence to the walls of the cavity and a dense surface,—two requisites for a good filling which no one, perhaps, will dispute.

The author then describes his methods of retaining the rubber-dam, which in some respects is peculiar, but has little of interest to those familiar with modes now generally adopted.

In the chapter on the management of gold he says, "For the method of rotation I regard the cylinder as the proper form, as it saves unnecessary labor. Leaf gold can be used, but must not be folded with a knife, as it becomes too hard when heated." He advises rolling the sheet. He does not regard Wolrab's gold as the *only* suitable form for this purpose, and makes the remarkable statement that "Wolrab sends more gold now to America than he sells in Europe." The writer of this was one of the first to recognize the value of this as equal to American gold preparations, and so informed the manufacturer some six years ago, but he cannot but regard it as a mistake to suppose it better. At that time it was prepared in the common form of leaves, with the well-known krinkled surface, formed by heating the leaves under pressure. This is a form common to many manufacturers and valuable in its place, but pure gold is practically the same whether it is manufactured in America or Germany, provided the same quality of intelligence superintends the manipulation.

The chapter on "Filling in General" may be passed over to give the author's mode of preparation and filling of incisor teeth, as these are perhaps the best representative cavities we have to deal with:

"I invest all the front teeth with the rubber-dam. I then test the space between the teeth by passing a peice of sand-paper through where the teeth are to be filled. If I find this impossible, I force a spatula-formed instrument between them, to sufficiently move them, and then fix them with a steel needle on hard wood, which I insert near the gum border. Then I draw the sand-paper through, which gives me a better view of both cavities. After the decayed border is removed with chisels, and the entrance to the cavities enlarged, the preparation of the gold is taken up. It may be said here that the rotation method requires no more room than is necessary for the excavation of the cavity. This may be ever so small and difficult to reach; if it can be entered by the drill, it is suitable for the rotation instrument. I fill all front teeth from the labial surface where it is possible so to do, and with the same instruments, and have not employed rubber for more than a year in separating, and very seldom have used cotton for this purpose * * * Now fasten in the hand-piece of the engine bit No. 5. This must be of a size to reach all parts of the walls of the cavity. A second finer instrument, No. 5, is laid aside for the purpose of condensing in the small angles. Of hand instruments, a heavy and fine instrument of No. 5 must be selected. It often happens that the latter is not small enough for minute cavities, in which case it is better to use a broken excavator smoothed off with sand-paper. * * * For condensing and polishing the filling use can be made often with advantage of one of the intruments for the engine, from 8-10."

The author then describes a steel strip that he makes use of as a matrix, but the mode of using it is not made very clear, and he then continues: "Before bringing the steel strip into place, after excavating, everything should be at hand necessary for the filling, so that the operation should proceed without interruption from beginning to the end. Two or more cylinders, or leaf-gold, are inserted with the thicker instrument, and pressed against the floor of the cavity with a quarter or half turn. This layer is condensed by the instrument adapted to the engine, and with a finer and smaller instrument defective places are sought for and filled. Every layer must be hard, and adapted to the walls of the cavity and the steel wall (matrix). The second layer is arranged as the first. (By the floor of the cavity, I wish to be understood as meaning not only that part, but also the palatine wall and the steel band which closes it.) * * * When the cavity is filled the surface should be gone over with one of the instruments adapted for the engine, 8-10. This should be repeated several times." He then proceeds to finish in the usual manner. The balance of this chapter might profitably be translated, but it is believed sufficient has been given to enable the intelligent operator to follow his methods. He then takes up cavities in the

several teeth, filling with tin and gold and amalgam by this process, and closes the work by quoting correspondence from this side, in which the method is duly praised, and in one instance (New York test) it is reported as having an adaptation superior to all other modes.

Having given Herbst's method with sufficient fullness, it may not be inappropriate to give some of the writer's views as to the originality of this method. The credit certainly belongs to Herbst of using the engine to effect his object, but it is impossible for him to claim either the use of the smooth points or the mode of rotation to produce necessary cohesion. It had been for many years the favorite idea of some that serrations were unnecessary, and not only that, but positively injurious to the gold. This led gradually to the abandonment of the deep serrations. Varney, it is believed, was one of the first, if not the first, to show that fine serrations were equally as effectual as those more generally used. He carried this idea to the use of smooth points, and filled to some extent with them, but never had much confidence in the work. It is no new idea that one piece of gold can be welded to another. This is as old as the manufacture of gold foil itself. But the difficulty has been to carry this indefinitely forward in the process of filling. Dr. T. D. Shumway (Dental Cosmos for March, 1873) advocated ivory points as preferable to steel for this purpose, and Prof. Thos. Fillebrown, in the same number of the Dental Cosmos, so clearly touches Herbst's method that it is not out of place to quote him. In writing of the instruments necessary to effect the packing of gold with smooth points, he says: "Three qualities are essential in the instruments,—strength of material, perfect smoothness of the points, and absolute hardness of the packing surface." He further remarks: "*Give the point a slight turn on its axis in packing*;" and further on, "*a turn of the point five or ten degrees when the gold is carried to its place* is all that can be applied with advantage." The italics are the reviewers. This is practically the Herbst method, brought out twelve years ago. Herbst *uses hand instruments* to place the gold in position, and condenses it with these before he finishes with the engine-bits, and he expressly insists on every layer being solidly placed before the subsequent one is attempted. That this is difficult is apparent from the fact that he recommends great care in placing the *last layer*, and it should be with *annealed gold*. Why, it may be asked, should this be required, if absolute solidity has been had throughout the work? He acknowledges that Dr. Bödecker recommends the mallet to be used on the last layer, but, from his interrogation mark, it is evident he doubts the necessity of this. With the use of hand pluggers and cohesive gold on the surface, it looks very much as though a weak spot had been discovered in the process.

The writer of this followed Herbst's directions some eighteen months ago, and spent much time with large expenditure of patience and gold, and *utterly failed to make one solid filling*. It may have been his fault, but he is of the opinion, since reading this work, that had he had the present hand instruments the fillings would have been more satisfactory, but probably never reliable. This is said in no spirit of opposition to the method, but from a positive conviction, based on long experience, that filling of teeth in this way never can be made a success. Herbst is to be honored for his work, as it was undoubtedly original with him, and it may be demonstrated in the future to have uses not now thought of. Every new process or an adaptaticn of old modes must be judged on its merits, and not by any high-sounding title, as the "German method." There is neither a German, American, French, nor English method of filling teeth, but there is one process which, if not universal, is at least not peculiar to any country, which bases the filling of teeth on *common sense*, and they are the true dentists who succeed in finding it.—J. T.

A System of Practical Medicine by American Authors. Edited by William Pepper, M.D., LL.D., assisted by Louis Starr, M.D. Vol II. General Diseases (continued) and Diseases of the Diges: tive System. Large octavo, pp. 1194 and index. Philadelphia - Lea Brothers & Co., 1885. Price, cloth, $5.00; leather, $6.00; half Russia, $7.00. For sale by subscription only.

The initial volume of this "System" was noticed in the Dental Cosmos for March, 1885. The favorable criticism, which it justly deserved, we accord no less freely to this. The various topics, so far as we have been able to discover, are discussed in a clear, terse, but comprehensive manner. The definition, etiology, pathology, symptoms, prognosis, and treatment of the several diseases considered are systematically presented. A marked feature in this, as in the preceding volume, is the thoroughly practical character of the essays.

The topics here included are as follows: In continuation of general diseases,—*Rhuematism*, by R. Palmer Howard, M.D.; *Gout*, by W. H. Draper, M.D.; *Rachitis*, by Abraham Jacoby, M.D.; *Scurvy*, by Philip S. Wales, M.D.; *Purpura*, by I. Edmondson Atkinson, M.D.; *Diabetes Millitis*, by James Tyson, M.D.; *Scrofula*, by John S. Lynch, M.D.; *Hereditary Syphilis*, by J. William White, M.D. The diseases of the digestive system include *Diseases of the Mouth, Tongue, Tonsils, Pharynx, and Œsophagus*, by J. Solis Cohen, M.D.; *Functional and Inflammatory Diseases of the Stomach*, by Samuel G. Armor, M. D.; *Ulcer and Cancer of the Stomach, Hemorrhage from the Stomach, Dilatation of the Stomach, and Minor Organic Affections of the Stomach*, by W. H. Welch, M.D.; *Intestinal Indigestion, Constipation, En-*

teralgia, Acute and Chronic Intestinal Catarrh, and Cholera Morbus, by W.W. Johnston, M.D.; *Intestinal Affections of Children in Hot Weather* by J. Lewis Smith, M.D.; *Pseudo-Membranous Enteritis*, by Philip S. Wales, M.D.; *Dysentery, Typhlitis, Intestinal Ulcer*, and *Hemorrhage of the Bowels*, by James T. Whittaker, M.D.; *Intestinal Obstruction*, by Hunter McGuire, M.D.; *Cancer and Lardaceous Degeneration of the Intestines*, by I. Edmondson Atkinson, M.D.; *Diseases of the Rectum and Anus*, by Thomas G. Morton, M.D., and Henry M. Wetherill, Jr., M.D.; *Intestinal Worms*, by Joseph Leidy, M.D.; *Diseases of the Liver*, by Roberts Bartholow, M.D.; *Diseases of the Pancreas*, by Louis Starr, M.D.; *Peritonitis*, by Alonzo Clark, M.D.; and *Diseases of the Abdominal Glands*, by Samuel C. Busey, M.D.

CHOLERA: Its Origin, History, Causation, Symptoms, Lesions, Prevention, and Treatment. By ALFRED STILLÉ, M.D., LL.D., professor Emeritus of the theory and practice of medicine in the University of Pennsylvania. Philadelphia: Lea Brothers & Co., 1885. 12mo, pp. 164. Price, cloth, $1.25.

We have here a volume which for all reasons it is a pleasure to read. The paper and typography are in keeping with the concise and pleasant style of the accomplished author. The subject, as Dr. Stillé states in his preface, has always had a peculiar attraction for him as a teacher and writer, he having had the advantage of studying it in two epidemics. The author enters upon the subject with a definition of the disease, gives its history from the first published accounts of it in the beginning of the sixteenth century as it appeared in India, its extension to China, Japan, Persia, Russia, Europe, and America, and in the various epidemics to the present time; its etiology, symptomatology, complications and sequelæ, morbid anatomy and pathology, diagnosis, prognosis, prevention, and treatment. Under the head of prevention he treats of quarantine, local sanitation, disinfectants, and gives a series of rules for its avoidance—the measures which experience has sanctioned to prevent its dissemination. While giving a complete but compendious history of the disease, the points most insisted on are those which relate to its prevention and treatment, and these are so clearly stated that any intelligent layman can comprehend and follow them. The subject has a special interest to the public as well as to the medical profession, in view of the possibility of the advent of cholera to the United States at a not remote period. We heartily commend the volume not only to physicians, but to the general reader.

PERISCOPE.

Aconitine for Anesthetizing Sensitive Dentine.—Dr. Anton Kozma, of Buda-Pesth, reports that a small piece of Japanese paper, three to four mm. square, saturated with three mgrm. of aconitine and pressed into the hollow tooth, previously cleaned out and dried, and then covered with an occlusive covering of gutta-percha, anesthetizes the sensitive dentine that renders operations on carious teeth so painful. The larger the quantity of aconitine employed the more quickly is the desired effect produced and the longer it lasts. The effect generally continues for from twenty-four to forty-eight hours.—*Medical Press.*

Broken Gum Teeth.—It is said, according to the *Dental Student*, that very many teeth, mounted on rubber or celluloid, are broken in removing the plate and teeth from the casing by hurrying or carelessness. Dentists often pry their flask open in a hurry, or rap the flask hard with a hammer to loosen the plaster, and by concussion break the teeth opposite the blow. A few have found it out by sad experience; but more prefer to lay the blame on the grade of teeth they may be using than to themselves. Another very easy way that the gums may be broken is in finishing up. How often, after taking a set from the flask, we find no cracks in the gums, but before finishing find the gums checked, which is done in holding the plate too tightly in the hands while filing. The rubber being pliable and springy, the gums being solid and thin, will break if they are sprung the least imaginable. A quick rasp of the file will also do this.—*British Journal of Dental Science.*

HINTS AND QUERIES.

Serious Consequences from the Non-Eruption of a Wisdom Tooth.—In February last a gentleman, aged about sixty, consulted me by advice of his physician. He complained that the muscles of his throat seemed to be drawn so tightly that deglutition was difficult and painful. His mouth was so nearly closed that I was scarcely able to introduce the end of my finger between his front teeth, while the cheek was so thickened by the swelling that it was impossible for him to close his teeth without lacerating it, and it was much bruised and discolored. The tissues of the throat were also much swollen. He had not previously consulted a physician or dentist through fear of being informed that the cause of the trouble was cancer, a theory which he had already accepted and under fear of which he had suffered for more than a year. The local trouble and mental disturbance had seriously affected his health, and he suffered at times much pain in his head and throat and in the muscles of the neck, extending into the shoulder and down into the arm. The patient could not remember that the superior right dens sapientiæ had ever erupted. The swollen tissues nearly covered the second molar. Probing through this mass, I came upon a hard, smooth surface which was evidently enamel, and clearly indicated the presence of a tooth. I made a cross-cut back of the second molar down to the process, and another at a right angle across the width of the buried tooth; then crowded the beak of an elevator behind the molar, catching the edge of the wisdom tooth and throwing

it back toward the throat. A hook elevator placed at the posterior surface of the wisdom tooth, completed its dislodgment. There was a discharge of pus, but less than I had anticipated. The approximal surface of the extracted tooth was badly decayed, but did not involve an exposure of the pulp. The pain gradually subsided, and in four weeks' time the parts had resumed their normal condition. In a practice of nearly thirty years I have seen many cases of troublesome wisdom teeth, but none in which a correct diagnosis was so difficult.—W. W. RICE, *Great Barrington, Mass.*

COCAÏNE SOLUTION TO BE KEPT FROM THE LIGHT.—In various articles on cocaïne it has been stated that after two or three weeks the solution becomes flocky and inert. I am a dental student, and keep my instruments in a case. I have also kept in it the four per cent. solution of cocaïne that I bought last November, and after many times using it with varying results I find it now just as clear and effective as at first. It would thus appear that when not exposed to the light it will retain its efficacy a long time.—EMILE AMEND, *Baltimore, Md.*

CLEMENTS VS. CAROTHERS—A NOVEL CASE.—Plaintiff makes and inserts an upper set of teeth for defendant, with the understanding that they are to be paid for when delivered. Defendant came in while plaintiff himself was out of the office, and got the teeth of plaintiff's assistant, who had no knowledge of the agreement. The defendant not paying for the teeth, suit was commenced, and judgment rendered against him for the amount due. Execution was issued and returned unsatisfied. An order was then made in proceedings supplementary to execution requiring defendant to appear before a referee and disclose as to his property. On the hearing he disclosed the fact that he had the teeth in his mouth, and that they were held in place by suction. The execution was then renewed and placed in the hands of the sheriff. On filing the referee's report the judge ordered the defendant to deliver the teeth to the sheriff to apply on the judgment. A refusal to obey this order would be a contempt of court, or defendant could be imprisoned, in case of such refusal, until the order was complied with. Defendant surrendered the teeth pursuant to the order, and the sheriff levied on them and advertised them for sale, as follows:

Sheriff's Sale on Execution. State of Minnesota, District Court, Rice County. S. T. Clements against A. B. Carothers.

Whereas, the judge of said court by an order filed in proceedings supplementary to execution in the above entitled action, on the 2d day of July, 1885, duly directed and required the above-named defendant to deliver to the sheriff of said county, on demand, the upper set of false teeth made by the plaintiff for the defendant, to be applied by said sheriff toward the satisfaction of the judgment rendered in favor of the plaintiff and against the defendant in said action, and the said defendant having delivered the same to the undersigned as such sheriff pursuant to said order;

Now, therefore, notice is hereby given that under and by virtue of a writ of execution issued out of and under the seal of said court, upon a certain judgment duly docketed therein on the 19th day of May, 1885, in favor of the plaintiff and against the defendant, in the sum of $21.10, I have levied upon the upper set of false teeth aforesaid, as the property of the said defendant, and will sell the same at public auction to the highest bidder for cash, at the south front door of the court house in the city of Faribault in the County and State aforesaid, on the 18th day of July, 1885, at 2 o'clock in the afternoon of that day, to satisfy the amount due thereon. ARA BARTON, Sheriff of Rice County

Dated July 6th, 1885. A. D. KEYES, Plaintiff's Attorney.

The legal questions involved are: First, were the teeth, while in defendant's mouth, a part of his person or a part of his property? Second, if a part of his property, were they wearing apparel? Third, if so, were they liable to execution for the purchase money? The court holds that they are subject to execution.

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ORIGINAL COMMUNICATIONS.

HEREDITY AND DEVELOPMENT OF THE TEETH.

BY ALTON HOWARD THOMPSON, D.D.S., TOPEKA, KANSAS.

[Read before the Missouri State Dental Association, at Sweet Springs, Mo., July 8, 1885.]

There is a growing conviction amongst the scientific members of the profession that the forces controlling development of the teeth, and especially the causes of defective tissual formation, must be looked for further back than the life history of the individual; that in the pre-natal influences will yet be discovered those forces dictating the variations in dental formation which are so interesting, but too often most disastrous in their effects upon the arrangement and quality of the teeth; in short, that, like other organs and tissues, the physical peculiarities and characteristics of the teeth are under the irresistible control of the omnipresent dictations of hereditary influences, be they immediate or remote. They are descended from the teeth of the ancestors of the individual in regular generations, in obedience to the law that "like produces like." Mere existence is inherited, and to be formed at all is to be formed like the being from whom organisms are descended and after whom they are copied. In view of this fact, the laws of heredity have an absorbing interest to us, and demand our study and investigation.

Briefly, then, heredity in general is that law by which every organized living being, plant, or animal is developed in the likeness—is the counterpart, more or less exact—of the parent forms which produced it. Its external form and features, its internal organs and tissues, are copied after the type of the species to which it belongs; all its distinguishing peculiarities being characteristic of that species. There is a law of type which governs the evolution of every molecule, the placing of that molecule in the building of tissues, the arrangement of those tissues in the growth and position

of organs in the structure of the individual so that it shall be a typal representative organization. That law is heredity. But the force in its entirety is not so simple as this easy definition. Within the limits of typal requirement there is such a range of variation that no two examples of any species are precisely alike. The activity of this variation brings before us such innumerable differences in the quality or quantity of structure, of external form and feature, of internal organ and tissue, that the complexity is bewildering. The labyrinths of the possibilities of variation can never be unraveled by finite man. Their classification would demand superhuman grasp, so that, with all the illumination the best intellects of the age have been able to throw upon the subject,—from Cuvier and Laplace to Darwin and Huxley and Haeckel, and the host of minor workers who are less known because occupied in special fields,—there still remains a mass of darkness that seems unfathomable. And of the great mass of learning already accumulated upon the subject, there are few men who can master the details of the knowledge we already have of heredity and variation in all its complexity.

Mr. Charles Darwin is an authority upon the natural history of inheritance, and in his various works describes it at length. Without detailing, we must here acknowledge our indebtedness for the substance of many of the generalizations which we will submit, and for some of the special rules given.

Man is the epitome of the experience of his ancestors. His every organ is made in that form which was most useful to them in the struggle for existence, and these, being adapted to the preservation and perpetuation of the species in his environments, he transmits to posterity; but he does not transmit the form and substance of tissues and organs unimpaired to his successors, but varies them in relation to his own experiences and the demands for readaptation to new surroundings. The individual experience of our species, as of other organized beings, is constantly exerting a pressure in one or another direction upon every organ, as it is used or disused,—beneficial or cumbersome and superfluous,—which tends to its modification. Variations are readily created and are as readily transmitted, thus exhibiting the flexibility of organisms. Variations generally arise for the benefit of the species, but even if injurious are as liable to be passed onwards. Variations occur for readaptation to changing environments, and, as these are ever altering, change is ever present, and an organ is never transmitted in precisely the same form and structure in which it was received. In civilized man the evolution of the species is now under the domination of that artificial life, that retirement from nature, in which he has incased himself. So the variations at present in progress in his organization may be considered

unnatural, if not detrimental, and injurious to physical perfection and natural integrity of organization. This is especially noticeable in the tendency to transmit imperfection and disease, as is so frequently noticed, amongst civilized people.

Dr. Lincoln Ray says that "two great powers or laws of nature coöperate in the perpetuation of a species. One of these laws produces difference, diversity, individuality, by which no two beings are precisely alike. The other great law produces similarity, likeness, uniformity, and it has two kingdoms or fields of action,—first, the species, in which it is supreme and only ruler; second, the individual, in whom it shares its sovereignty with the first-named law. The first is the law of diversity, the second the law of uniformity or heritage. The law of hereditary transmission is identical with the great law which preserves the immutability of species. The difference is in the scope, not in the nature, of the law. In its first field of action it transmits inevitably specific traits; in the second it transmits, not inevitably, individual traits." He concludes, "first, that from healthy and non-consanguineous ancestors proceed a posterity of which a very large proportion are born perfect, sound, and with tendencies toward healthy procreation; second, from unhealthy or consanguineous parents proceeds a posterity of which a very much less proportion are born perfect, etc. Or, to make the correlative statement,—healthy and unrelated ancestors produce a posterity of which a very small proportion are imperfect or unsound; while unhealthy or related ancestors produce a posterity of whom a much larger percentage are imperfect or diseased."

Speaking of the persistence of race as one of the wonders of heredity, M. Topinard, in his "Anthropology," says, "From inheritance emanates the law of permanence of types. In the pure race all the individuals resemble each other as regards their main features. The law of inheritance is that the son is the exact reproduction of his father and mother, but there is also a conflict of all the other elements which figure in his genealogy. In every individual, as in every generation, there are two opposite tendencies,—the one to divergence or variability of characters; the other to concentration or perpetuation of characters. The force presiding over the latter is inheritance, the property of living beings to reproduce themselves under the same forms and with the same attributes." But individual experience causes variation, as apposed to racial experience, which causes permanence. "There is a struggle between the characters; some are added, others neutralize each other, others are reciprocal and mutually assistant, others totally destroy and abort apposing characters. The most remote ancestors have their share in forming the individual as well as the immediate parents. In atavism the reappearance of char-

acters is a matter of chance, or rather there are in the germ latent powers which are awakened into activity by favorable influences, The principal forms of inheritance are (*a*) *continuous* inheritence, when the son resembles both parents, and these their parents ; (*b*) *interrupted* inheritance, when, without resembling either father or mother, he is like a grand-parent,—this being very noticeable in the transmission of disease, it frequently appearing in alternate generations ; (*c*) *collateral* inheritance, when a child resembles an uncle or grand-uncle or aunt ; (*d*) *atavic* inheritance, when the resemblance goes further back to more remote ancestors, its appearance in succeeding generations being erratic. Some children are exactly like the father, others like the mother, others again like other ancestors or relatives. * * * Examples of interrupted, collateral, and atavic inheritance are numerous among mixed races, the characters which mongrels exhibit being notable examples of the law. Thus, a mongrel of the first blood may be exactly intermediate between the two parents, or may have a predominance of the peculiarities of one race in some of the features and of the other in others. As further mixture goes on, some racial characters are apt to be retained to remote generations. * * * Two pure races will have a better progeny than two impure races. Where one is pure and the other impure, there will be a progeny intermediate in purity."

One feature of the laws of inheritance does not seem to have received the attention which its importance demands, and that is the action of *sexual alternation* in the transmission of natural or abormal peculiarities,—that is, that the child usually reproduces the physical peculiarities, temperament, size, structure, disease tendencies, etc., of the parent of the opposite sex. Thus, the sons are likely to resemble the mother, and the daughters the father, in physical form and character. Or, if they do not resemble the immediate parent, the resemblance will be traceable through them to *that* parent's parent *of the opposite sex*. Thus, if the son do not resemble his mother, he will be found to be like *her* father, or *his* mother. It is interesting to trace these resemblances in regard to the teeth, and find with what exactness the law is carried out. The rule is not invariable, of course,—no rules are so,—but there is sufficient stability in its action to elevate it to the dignity of a law and to proceed upon the assumption of alternate sexual inheritance in generalizations. *Atavism*, which is so imperfectly understood, may be but the persistent effect of the workings of this law down through remote generations, when features appear which have been totally forgotten in a family. Thus, a child will appear in a family with red or other colored hair which is entirely different from all the rest of the members, and no one remembers when an ancestor had such a feature.

Or, a peculiarity will crop out which is a distinct characteristic of a race totally foreign to that of the family, the time of such crossing having been so remote as to evade the possibilities of investigation. Thus it is that features are constantly reappearing in an apparently erratic manner, without regard to traceable inheritance; but if the history of the family could be accurately traced, there would always be found an ancestry to explain unusual characters. Mr. Wm. Sedgwick has given us some observations upon the influence of sex in hereditary disease, in which he says, "Sexual limitations, although met with in all forms of hereditary disease, is more constant and more strongly defined in those diseases affecting hereditarily the skin and its appendages than in those affecting the other organs or tissues of the body. And this should not be surprising when we consider that sex modifies the structures in man as in the lower animals,—thus, the absence of the beard in woman, the variation of the plumage in birds, the weapons of combat possessed by the male in many animals, and their absence in the female, etc. In abnormal excess or deficiency of hair abnormal development of the teeth often also appears, some of these cases occurring according to the laws of atavism. These are often limited to one sex, or appear in alternate sexes."

But let us now apply these laws to the study of the development of the teeth. We find that, being dermal organs, they are peculiarly susceptible to the influences of heredity, and also to causes of variation. Not only is the type of tooth usually determined by the impress of one or another of the parents, but its particular defects are the result of the parental impressions, of unfortunate temperamental, consanguineous, or diseased combinations. Of course the immediate influences are not all that is to be considered in the structure of the teeth, but, regarding their deficient formation, these are usually paramount to all the influences of remote inheritance. Special defects are usually traceable to recent inheritance.

Carpenter says: "The influence of parents upon offspring is strikingly manifested not merely in the mixture of their characters, normally displayed, but by the tendency to hereditary transmission of perverted modes of nutrition and functional activity which may have been habitual to either. Many diseases are accounted as hereditary, and perhaps others may be added to the list. The predisposition may have been congenital on the part of the parents or acquired by themselves. The intensification which almost any kind of perversion of nutrition derives from being common to both parents is most remarkably evinced by the lamentable results which too often accrue from the marriage of individuals nearly related to each other and partaking of the same 'taint.' Aside from taint, even a strong

idiosyncrasy is frequently present, which, by being intensified, may give rise to unfortunate mental or physical defects." But consanguinity, pernicious and powerful as it is for evil, by multiplying family weaknesses or diseases in offspring, is not the only cause of the augmentation of deleterious predispositions. Persons not related by blood may be possessed of "taints" or idiosyncrasies or defects of organs or tissues so similar that, by combination in offspring, they will lead to excessive exaggeration. In regard to the teeth, this will have an especial effect, owing to their peculiar susceptibility.

But let us here notice what Dr. Norman W. Kingsley says upon this subject. He writes that "many of the forms of irregularity with which we are familiar are directly traceable to inheritance and transmitted peculiarities. Especially is this true when it is confined to one or two teeth,—the primary cause, so far as that individual is concerned, is an hereditary family peculiarity. The teeth of every person possess more or less individuality, and most of those features which stamp their individuality are hereditary. The form and color of the teeth, when not disturbed by abnormal influences, are derived from the same source. Any departure from typal form is a peculiarity of descent, as well as any predisposition to defect or deformity. It is a most wonderful subject for contemplation that at some remote period in the history of our progenitors, when nature departed from the normal type to produce, say, a deformed lateral incisor, a twisted cuspid, or to suppress a lateral or a third molar,—that, following down the line of descent, we find precisely the same peculiarity appearing and reappearing in the same line, and again not in the line, but in different branches of the family." Defects of structure, as well as of form and arrangement, are also transmitted more or less directly. Thus, we know that children frequently have the same defects upon the same teeth which the parent possessed, and that they become carious, and are lost at the same age; or, owing to the increased ratio of deficiency of structure by inheritance, are lost earlier in the child. A minute defect of contour, fissures, extra cusps on lingual or palatal surfaces, peg-like teeth, total absence of particular teeth, dark or soft areas in the enamel,—all these and more are often transmitted as family peculiarities.

But the peculiarities of form or defects of the teeth are transmitted with exact regard to the laws of heredity and variation. Thus, a child's teeth will likely most resemble the teeth of the parent of the opposite sex, or that parent's ancestors, with their peculiar forms or defects. Or, again, its teeth will bear the marks of atavism and resemble a remote ancestor. This will sometimes account for the appearance of a good denture in a family whose individuals have very defective teeth, or *vice versa*. Sometimes there is a blending

of the types of two or more ancestors, the front teeth presenting the good organization of one parent, and the molars the bad structure or diseased organization of another. But this is not so usual as for the entire denture to partake of the structural integrity of the dominant hereditary influence. When this is diseased, as when syphilitic, phthisical, gouty, strumous, etc., the teeth are prone to partake of the taint, subject of course to the occurrences of exacerbation and latent periods of the disease during formation. Through their susceptibility the teeth are unfortunately recipients of a legacy of disease in most of its varied forms; and it does not seem that in them it tends to lessen by the natural powers of elimination which most tissues possess; so that in time hereditary disease will exhaust itself and run out. But with the teeth the opposite rule obtains, that the tendency is toward augmentation by transmission, and the disease exhausts itself only when the organs are destroyed. Natural elimination occurs in the individual, of course, but while the disease is in the system the teeth have no power of resistance to its interference with structural integrity.

But the suppressive effects of disuse, as affecting development of the teeth through heredity and variation, are also to be noticed. In no class of organs are the inherited effects of variation due to the influence of changed conditions so marked as in the teeth of man. Being thus susceptible to the effects of active employment or of neglect, they have, by the protracted operation of disuse weighing upon them and retarding their production for generations, become, as one of its effects, so defective and incomplete as to approach the condition of rudimentary organs. The active employment of an organ makes demands upon the nutritive powers for its growth and strength which is responded to by increased nutrition and added strength by those powers, and use gives an impetus to transmission which causes that organ to be well and strongly developed in the next generation. But disuse furnishes no stimulus to either nutrition or transmission, and the organ so affected is produced as a tradition due to the stimulus of past generations, when it was in active employment; but, owing to its disuse in recent generations, it is weak and ill-formed; it has not the necessary stimulus either for development or strength. Not only that, but an organ that has fallen into disuse and neglect becomes deleterious and injurious, and is, by a natural process of economy of growth, deprived of nutrition, that it may be suppressed and aborted. The remains of many such organs linger in the organization of man as rudiments of former organs which served a useful purpose under different modes of life; but the conditions of life being changed by new environments, these organs became useless, then injurious, and were gradually suppressed by the law of economy of growth.

Such organs the teeth in man are rapidly becoming. Indeed the wisdom teeth have already arrived at that stage in their career of suppression when they are little more than rudiments. They are never well organized, are often rudimentary in form, and often totally absent, either through failure to erupt or to develop. The wisdom tooth in the race is departing, and we are the cotemporary witnesses of the act of its abolition as a useless organ. Will the second molar follow it in time, and then the other teeth in more or less regular succession? We do not know. We only speak of what we observe. But we do know that all the teeth are defective in form and deficient in structure in most of the individuals of the luxurious races of man; that they require the constant care of a skillful and costly corps of professional men to preserve them at all, and that the diseases which are causing their destruction result from the effects, more or less direct, of defectiveness of organization due to disuse. But this branch of the subject is too vast to enter upon at this time.

The effects of disuse are rated as one of many pernicious influences which cause defective formation through inheritance. When so much dental defectiveness prevails it becomes us to estimate all forces likely to contribute to it, and the greatest of these we believe to be the malign power that, through heredity, presides over formation. If heredity is strong for normal structure; if physiological perfection is exactness of detail in the copying of the type, then, indeed, must heredity be strong in its influences where there is present any evil power which detracts from or interferes with normal development. If it transmits evil as readily as good,—and there is no question of this,—then must we charge it with the responsibility of being the medium through which much dental defectiveness is brought down to us. If it would transmit only the good, disease would soon be eliminated in the species, but unfortunately health, unlike some diseases, is not always transmitted and is never contagious.

A FACTOR IN TOOTH-PRESERVATION.

BY C. N. PEIRCE, D.D.S., PHILADELPHIA, PA.

[An Address before the New Jersey State Dental Society, July 16, 1885.]

Mr. President and Gentlemen of the New Jersey State Dental Society: I fear that I am trespassing a little upon your good nature in coming before you without a written essay, but my time has been so limited in preparing for this occasion that the very best I could do was to arrange some thoughts and give them to you as well as practicable under the circumstances. In answer to an inquiry from my friend, Dr. Palmer, as to the title of my subject, I wrote him

that it would be "A Factor in Dental Caries," but I subsequently changed it to the more intelligable one announced by your president to-day, "A Factor in Tooth-Preservation;" and I am under obligations to my friend, Dr. Atkinson, for opening the way for me last last evening, by his opportune remarks on the prophylactic influence of function, because that has been really the subject of my thoughts for the last three months, and was the point I endeavored to make in my remarks a month ago on the comparative anatomy of the teeth before the New England and Connecticut Valley Dental Associations at Worcester, Mass. What I shall endeavor to do now is simply to elaborate the remarks of Dr. Atkinson last evening, and confirm them with some illustrations of development of the teeth of the lower animals, hoping with these to leave an impression upon your minds which will not soon be erased.

First, a word or two upon dental caries. If you ask the numerous teachers in this country to formulate an answer to the inquiry, What is dental caries? they will probably tell you that it is molecular death and disintegration of the tooth-tissue. We will not stop now to discuss the correctness of this answer. It is one that has been almost universally given to classes in dental schools, as well as in the meetings of dental societies. Molecular disintegration we have, but that this is preceded by death is doubtful indeed, and this one point in this pathological phenomenon is well worthy of consideration by any dental society. Many theories have been advanced by thoughtful men regarding the cause of this pathological condition designated dental caries. First, it was held that it was wholly due to chemical action; and there are men to-day who take the ground that that is the only cause. They claim that there is some solvent (an acid) in the mouth which comes in contact with the tissues of the teeth, breaking up the continuity of the structures and dissolving out the lime-salts or inorganic portion. Then, there are others who take the other extreme, and assert that dental caries is the result of vital action; that through some deficiency in nutrition and other abnormal systemic conditions there is a loss of continuity between the hard or inorganic and the soft or organic structures, and in consequence of that loss of continuity the dissolution of the teeth naturally follows. Another theory is that the cause of decay is chemico-vital; that perverted or imperfect nutrition during the calcification of the hard tissues results in abnormality, both as to quantity and quality, this being a predisposing cause of caries, the teeth then becoming an easy prey of some solvent in the mouth, which is assumed to be an acid. We have, also, within the last few years, had advanced by our friends abroad as well as at home what is termed the parasitic

theory,—that decay is produced by certain low forms of vegetable or animal organisms in the mouth, some of which, by their roots or mycelium, burrow into the tissues of the teeth and leave them in a condition to readily break down, and that other organisms, by virtue of their contact with the oxygen of the atmosphere, eliminate an acid, and in that way we have a solvent produced by these which disintegrates the tooth-structure. These latter theories entirely overlook the fact that many of these organisms are merely messmates; that they live in the mouth by virtue of the pabulum on which we also live, and are not parasites at all,—living on the remains of our food, on dead and refuse material, and not interfering with the live tissues in any way. Then we have still another theory, that advanced by Dr. Bridgman in England, called the electrical theory; that it is by reason of a want of correspondence in the electrical conditions of the organic and the inorganic structures that the teeth are broken down.

The fault I find with all of these theories is, not that they, or most of them, have not some grain of truth in them sufficient to warrant their advancement as elements in the problem of decay, but that it is claimed by their several and special advocates that they are *the* element. In attributing dental caries to any one of these supposed causes, we seem to entirely ignore the laws governing the development and nutrition of structures.

When a tooth is developed, it is in accordance or in correspondence with law, like other tissues. Its morphology, its structural arrangement, its density, its size, its location, all are subservient to its function and nutrition. If function is delegated to some other part or organ, nutrition is likewise diverted. Health and normality in any and every respect must be preceded by normal or natural exercise of function. The arrangement of the tissues, the size, shape, and density of the teeth are not matters of whim or accident, but are due to the natural result of the mechanical forces that have been brought to bear upon them; they are the result of the degree and direction of force that has been exerted upon them by the food habit through many successive generations; they are in exact correspondence with the amount and direction of force that has been and is exercised in the preparation of the food, or in the exact ratio of the amount of resistance offered by the trituration of the food upon which the animal lives. This brings tooth-formation down to the single point of food habit, and in my estimation *tooth-formation and nutrition are the result of food habit.*

In the treatment of the mouths of many children we see unmistakable evidence of this absence of function. We risk nothing in saying to the mother or guardian of many of these patients that

the food is washed into the stomach with one of various liquids without mastication, and we may with safety and great propriety add that, unless there is some change in the food habit of this child, our success in the direction of tooth-preservation will be but limited. Fluids must be restricted at meal time. Solid food must be substituted for the semi-solid, and the eight or ten minutes usually occupied in the consumption of a meal must be extended to twenty-five or thirty minutes. I say constantly to the parents of my young patients: If you want to save this child's teeth, you must banish drink from the table during meal time; let the children drink all they want before and after meals, but at meals the food should be taken as nearly dry as possible, and let the child spend half an hour or more in its mastication, utilizing the natural secretions; not washing down its food with copious draughts without an effort on the part of the teeth to triturate and prepare it for the subsequent digestive process. I bring up this point here because I want to make it more clear that, in my estimation, the loss of function is one great cause of this rapid decay of the teeth. The healthy or normal development of the teeth is exactly in proportion to the stimulus of the resistance that is offered to them in the cutting or mastication of food.

Now, gentlemen, a recognition of the foregoing is what interests *us* as dentists, and in behalf of our *patrons* or *patients* for their own welfare and comfort. In continuation of my remarks, I hope, with the aid of these specimens upon the table before us, to show you how these various tooth-forms have been the result of jaw movements, and these movements, again, a necessity by virtue of the kind of food; and so in regular succession, we can safely say, first, that food habit has been the important factor and controlling influence in shaping tooth-forms; second, that the restriction and limitation of diet has contributed to specialization of the teeth; third, the degree in which teeth are changed or modified in form and structure is in proportion to the differences in the degree of resistance to be overcome in the mastication of food.

For the sake of perspicuity, and at the risk of being tedious, let us first define a tooth, with its location, function, etc.

The definition given is, that it is a hard substance projecting from the surface of the mucous membrane; it is differentiated from the surrounding structures, and opposes another tooth, or a dental plate, or else in its function works against some other substance less dense. It is located in the anterior or pre-assimilative portion of the alimentary canal, and in the mammalia it is confined to the inferior and superior maxillæ, always working in a vertical or modified vertical direction, and against other teeth or some dense substance, so as to stimulate its nutrition and health.

All teeth may be arranged into five classes. First, the simple cone-shaped tooth which is represented in the cuspid of the carnivora, the prehensile teeth of all animals swallowing their prey whole, and a large class of fishes, as well as the poison-fang of reptiles and the teeth of the sperm-whale. These are among the simplest forms of teeth found in the animal economy. The next would be a chisel-shaped tooth, examples of which we see in the incisors of the rodents and other vertebrate animals. In the third class we place the trenchant-shaped teeth seen in carnivorous animals, which shut over each other like the blades of a pair of scissors, and are for lacerating or tearing. Then come the teeth which we find in the monkey tribe, having little tubercles on the triturating surface for crushing. The fifth and last class are the molars, represented by those of the elephant and of the rodents, but the most specialized or typical are those found in the herbivora, used for grinding grass and dry food. Nearly all the teeth of the animal kingdom may be placed in one of these five classes, by a little addition or subtraction corresponding with modifications in food habit and mandibular or jaw movement.

When we pick up a mandible that is armed with cone-shaped teeth, we know very well that its movement is limited to a vertical or up-and-down motion. The teeth in it are not for the trituration of food, but for seizing it. Corresponding with this cone-shaped tooth and the vertical motion which is found in all carnivorous animals, and which is not a mere matter of taste or accident, but of necessity, because of the class of food upon which the animal subsists, we find the shape of the condyle and the glenoid cavity to correspond,—the latter hugging or so adapted to the former as to preclude any other motion. So we see that the food habit controls, not only the movements of the jaw and shape of the teeth, but the form and adaptation of the condyle and glenoid cavity.

We now take the other extreme in shape, represented by the molars of the rodents and the elephant. We find instead of the glenoid cavity a convex surface, and the condyle a flat or slightly concave surface, which slides over the convex surface of the glenoid cavity; and this arrangement permits not only a lateral motion of the jaw, but the antero-posterior, which is so essential to the rodent. But the food habit of the animal was the first factor or necessity which produced the lateral and antero-posterior motions, and these motions gave us the tooth-form, the condylar articulation of necessity following. We might follow this up through the whole anatomical structure of various animals, and find corresponding results in the digestive organs as well as in the modes of progression of the animals.

The teeth of the mammalia, and indeed nearly all of the Vertebrata, are made up of three tissues,—dentine, cement, and enamel, the enamel-germs being present in all. In a large class of animals, as in man, these tissues are arranged with the dentine in the center, the enamel covering the dentine of the crown, and the cement covering the dentine of the root. This is the common arrangement in the teeth of all carnivorous and omnivorous animals; and in these animals we find the teeth less specialized than in the herbivora and rodentia, where, instead of having the enamel covering the crown, it is arranged in transverse lines running across the triturating surface, or the peculiar W-shaped pattern, by a dipping in of the enamel from the sides, as is seen in many of the herbivora. Where there is an antero-posterior motion of the jaw in connection with the lateral we have these lines running transversely across the teeth, and with this the most complex structural condition. The object of this arrangement is patent to every one,—the three tissues being of different degrees of density, and standing side by side, there will always be an uneven surface, with the most dense tissue prominent. which is most efficient in the preparation of the dry food upon which the animal subsists.

Again we recognize that this peculiar adaptation of the teeth to the necessities of the animal is the result of food habit. There is no exception to this rule. It is the force exercised upon the teeth which modifies their form and structural arrangement.

If you will bear with me a few moments, I will show you how true this is throughout the animal kingdom. Taking, first, some illustrations from the Invertebrata,—animals without a back-bone,— their teeth are with few exceptions not dense, but shaped by food habit and jaw movement so as to be efficient in mastication. Commencing with this little animal which I hold in my hand, and with which we are all familiar, the Echinus, designated Aristotle's lantern, because first described by him, we find that it has five teeth and five jaws, moved by thirty-five muscles. It subsists upon shell-fish, and by the movement of these teeth, with sharp, cutting edges, it drills a hole in the shell of its prey and sucks out the juices. The Echinus is an animal with primitive nervous organization, yet it has sense enough to have good taste, and by its liking for shell-fish does considerable injury to the business of the oysterman. This is one of the most complex arrangements of tooth-structure that is found in the animal economy.

Our next illustration we take from the common leech. We are all familiar with the manner in which this Articulate makes its wound. The animal has three jaws, which are simple semi-circles, and are armed with teeth or denticles, not for mastication, but for

cutting the flesh of its prey, and making a wound from which the animal draws the blood upon which it lives. It shows the adaptation of teeth to the necessities of the animal. The drawing upon the black-board shows the jaws attached to the second segment, and so arranged as to make a tri-radiate wound. Among the intestinal worms, I may instance the tape-worm. You all know how difficult it is to dislodge this disgusting parasite from the alimentary canal. It has a circular mouth, armed with little hooks, which seize hold of the walls of the alimentary canal, and hold fast while the animal sucks the juices upon which it subsists. In that way these hook-shaped teeth aid the animal in obtaining its nutrition.

Then we come to the Mollusks, of which the varieties described may be numbered by the thousands. We may divide them into two classes, those with and those without heads. The headless ones have, of course, no teeth; while the food habits of some with heads are without the necessity for teeth, and hence they are edentulous. But in those that have teeth we find the variety in shapes corresponding with the difference in diet; so, as the little Mollusk lives upon vegetable, animal, or liquid food, the teeth quite as readily correspond to its necessities as do those of the Vertebrate series to theirs. So in these, again, we have this selective influence of function, giving us structures in these plastic animals which are as fully adapted to their needs as are those enjoyed by the higher animals,—*teeth modified in shape, substance, and arrangement by food habit.* The different materials upon which the teeth are required to act and the different movements of the tissues in which they are implanted tend to produce that peculiar shape and structure which is most efficient for their nutrition.

Passing to the Vertebrata, we have a large class of vertebrate animals whose teeth we know have been either modified or wholly lost by reason of changed food habits. Birds to-day have no teeth, yet Professor Marsh, of Boston, has described some fossil birds which were furnished with well-developed teeth like those of other Vertebrates. There is an immense variety of fishes, which are placed by Professor Marsh in five great classes: the Leptocardia, Marsipobranchii, Elasmobranchii, Ganoidei, and Teleostei. The first of these, described by Haeckel as the acrania (without a skull), have no teeth, while the others have almost an endless variety. The Marsipobranchii, of which the lamprey are examples, have pointed, horny teeth. The Elasmobranchii, embracing the rays, saw-fish, sharks, etc., have teeth with sharp points peculiarly adapted to their habits of life; and so on throughout the whole series, furnishing a greater variety of tooth-formation and attachment than any other class of animals.

Before leaving the fishes I want to direct your attention to this little toad-fish which I hold in my hand. We find the body covered with spines, and a similar one in each jaw, except that their location has given them a different function, and they have become modified by virtue of it. This is an illustration of the dermal origin of the teeth, and is equally well shown by a newly-hatched dog-fish, where at this age you can scarcely distinguish the spines located on the jaw from those on the dermal surface. These, becoming modified by function, soon present a different appearance.

Next we come to the Reptilia. They have but few teeth. A poison-fang is remarkable for the peculiar arrangement for conducting the poison into the wound made by it. It would be much like taking an ordinary tooth, with the enamel and dentine on it, and rolling it out flat and doubling it upon itself, the pulp cavity occupying its normal position. In folding it over we get a semi-canal connected with the sack of poison-fluid at the end of the root. The direction of the tooth is horizontal when at rest, but when elevated to pierce the prey a membrane is drawn over this semi-tube, so that it makes a complete canal, and as the animal strikes its prey the pressure upon the sac at the root ejects the fluid through the canal into the wound made by the fang. Another peculiarity is that we have an endless succession of these fang-germs, so that when one is lost another is developed in its place. This is true of nearly all the fish series,—where teeth are lost by violence or injured by wear, new teeth soon take their place.

I have here a peculiar specimen, which represents the Edentata or insectivorous animals, an ant-eater, which is deficient in front teeth. The molars it has are little round pegs, made up of dentine without enamel. The front teeth are deficient, yet in some of this group there is a lateral incisor, and in nearly all there are germs of both lateral and central incisors. They have not been developed for generations, yet the germ being present, represents the original idea and form of development, although it is aborted. Loss of function has greatly modified the teeth of this animal; the relegation to the tongue of the function of the incisors has made those teeth no longer necessary; hence they have disappeared, only the germs remaining to indicate the former type. The posterior teeth, having no hard substances to grind, have wholly lost their enamel; they are specialized for the service of the animal. This is not the true armadillo, although allied to that family.

As teeth are specialized by function and adapted to certain kinds of food, they are usually reduced in number; so, also, as we go up in the scale of intelligence from the lower to the higher, increased brain development seems to have a similar influence, the ancestral animal

usually having had a greater number. Relegation of function brings diversion of nutrition.

Next in order comes a class of aquatic animals, which includes the Sirenia, or sea-cow, an herbivorous animal living in the water, and which is furnished with molars adapted to its diet. To this class of aquatic animals belongs also the spermaceti or sperm-whale, whose teeth are strong and cone-shaped, giving us the idea of prehensile use, and ranging in size in correspondence with location in the jaw, the heavier ones being located nearer the articulation. Its prey is seized and swallowed whole.

In the Mysticetus, or right whale, Balænoidea (the largest mammal), we find a set of teeth in embryo, but they are functionless and absorbed before birth. At birth, in place of teeth are developed thin plates that run transversely across the jaw, some two hundred in number, and varying from ten to twenty feet in length. These great plates, which furnish the whalebone of commerce, are attached to the upper jaw, and form a sort of fringe on their lower edge, in which, as the animal swims through the water with open mouth, thousands of small, jelly-like animals which abound therein become entangled. The water being expelled, these are transferred to the œsophagus of the whale and become its food. These plates are an adaptation of teeth specialized to the needs of the animal, and serve it in its nutritional demands.

In the Quadrumana, embracing the lower monkeys and lemurs, we have teeth for crushing fruits,—tubercular teeth, and very closely allied to those of the human family, but somewhat different in form, and in some greater in number, the cuspids being more prominent and serving the males for weapons in combat.

Then we come to the Anthropoidea, a group that embraces man as well as the higher apes. This group has teeth alike, save in the prominence of the cuspids; but in this ascent in the scale towards man we lose some of the teeth, the lemurs and lower monkeys having thirty-six, while the Anthropoidea have but thirty-two. And it is a question worthy of consideration whether the frequent absence of the third molar in the human family is not in the same line of reduction; absence of function sending the nutritive current to other localities.

It is probable that, with a continuance of our present diet and manner of living, it will not be many centuries before man will have twenty-eight instead of thirty-two teeth. It is also probable that this reduction will be facilitated by the effort of specialization, which is constant.

Man is an omnivorous animal, and in his mode of living his teeth are not subjected to the use or kind of diet which is best calculated

to insure their health. If we had the opportunity of examining any large class of people who were now and had been for some centuries confined to a limited diet, with little or no animal food, we should expect to find incisors well developed, cuspids somewhat suppressed, and molars assuming a more herbivorous type, having cutting tubercles, and showing a tendency to the infolding of the enamel.

We do know that during the period in this country when the negro of the South was confined to a coarse diet he had fine incisors and strong molars. His cuspids were not more prominent than is seen in the higher races. This we should attribute to the fact of his diet being largely granivorous and coarse. You know that in all strictly herbivorous animals the cuspids are either entirely deficient or are merely present in a transitionary form.

The carnivorous animals, whether aquatic, terrestrial, arborial, or fusorial in their habits, or whether occupying the polar or equatorial regions, are alike true to their cuspids and carnivorous molars,—illustrating again the influence of food habit.

The rodentia, of which this beaver is a very good type, have finely-developed incisors growing from permanent pulps, and molars with transverse lines of enamel. These forms are the result of the gnawing habit, which necessitates the antero-posterior movement of the mandible. Accompanying this is also the peculiar arrangement of the three hard tissues of the teeth, which always gives the incisor a sharp, cutting edge, by placing the enamel, which is most dense, on the external or labial surface; the dentine next; and the softer tissue, not unlike cementum, on the internal or palatine surface.

Now, Mr. President and gentlemen, I might continue these illustrations through every modification of the animal kingdom, and show you that, whenever there is a differentiation in the food habit, there is a corresponding one in mandibular movement, which is accompanied by a tooth-formation resulting therefrom, and that the condylar attachment or articulation is so constant and true to the mandibular movement and tooth-form that, when once recognized, there would be no difficulty in describing the movement of jaw and tooth-form belonging thereto.

In recognizing the conditions which induce morphological peculiarities and modifications in dental structures, we certainly have some light thrown upon a condition which might induce tooth-degeneration,—in the one case functional activity, followed by healthy nutrition; in the other, functional inactivity, or the absence of function, followed by diversion or relegation of nutrition to other localities.

In conclusion, gentlemen, let me once more impress upon you the importance of the influence of function as a prophylactic agent, and

suggest that, in our duty to our patrons, we can render them no better service than by enlightening their understanding to this extent.

DENTAL CARIES.

BY A. MORSMAN, M.D., D.D.S., IOWA CITY, IOWA.

PART FIRST.—PREDISPONENTS.

1. Errors of Organization.

Nomenclature.—The term organization is used here strictly in the limited sense of quality. It has no reference, save indirectly, either to calcification or form. That tooth is well organized whose elementary constituents are of the proper kind and quality, physiologically and perfectly combined. The standard is of course a typical tooth, possessing the qualifications of density, strength, and resistance to disease.

General Considerations.—It becomes early evident to the dental practitioner that teeth are not alike in organization; that the variations in form and color are not more numerous than the variations in quality. Some are hard and resistive under his heaviest cutting instruments. Not only do they resist mechanical force, but they resist well those insidious, destructive forces whose aggregate result we call caries.

At the other extreme there are teeth whose elements have so little cohesion, and yield so readily to disintegrating forces, that they have frequently received, and perhaps merited, the appellation "chalky." They yield readily to caries, and are the *bête noir* of the dentist. As dentists we have most frequently under our observation teeth structurally imperfect, and we must be guarded, therefore, in drawing conclusions as to the relative frequency of mal-organization. It is nevertheless impossible to discredit the cumulative testimony of writers and observers tending to show that a very large portion of the civilized human race are possessed of teeth below normality of organization. Not that only, but also that there has been for generations past, and still continues, a progressive increase of variations from the quality type that is not accounted for by increased population. If we grant this, then we must admit one of two propositions: either there is general systemic (race) deterioration, or else the teeth, subjected to some special influence, deteriorate independently of the general system.

Those who hold the theory of race deterioration claim that new diseases, the result of brain and nerve stimulus, are constantly being acquired and becoming hereditary; that society preserves its weaklings to marry and bear debilitated offspring; that this preser-

vation of the weak and diseased, consequent upon improved environment, is the cause of increased longevity; that man works against nature's laws, and the fittest does not survive; that the teeth are only a part of the general system, aud retrograde with it.

The doctrine is a monstrous one. Surely there is no evidence of race deterioration. The statement that increase of life is *only* to the weak or diseased is untrue. The weak and diseased are not the mass of humanity, and brain-workers are but a small proportion of mankind. Doubtless the influence of city life, with its overcrowding and bad ventilation, its artificial habits and stimulants, do not tend to improve the race, but a very large proportion of our population is rural and in small towns.

In animal life we find, under natural conditions, structurally perfect teeth. I speak in a general sense, without regard to isolated cases. *A priori*, man in his primitive state would, we are reasonably certain, have been as well supplied as other animals. Ancient skulls have been examined and much has been said to refute this proposition. That caries has always existed to some extent, even in animals, we have abundance of evidence, but there is no evidence to show that it was anything but a comparatively rare disease.

A skull of decided antiquity may present several carious teeth, but that does not demonstrate defective organization of those teeth. The best of teeth *may decay*. The worst of teeth *will surely decay*. Our posterity will find *young* skulls entirely edentulous, or with teeth *all carious.*

There is no room for doubt that there is an organic predisposition to caries in some teeth, not accounted for by the errors of calcification, and that it is not always dependent upon systemic disease. Unfortunately, we have had no published observations as connected with the quality of the teeth and the health of the individual. The carious tooth alone has attracted attention. The study of this condition is therefore difficult and unsatisfactory.

Considerations of Temperament.—In this connection I will say that I am greatly indebted to the articles of Drs. J. Foster Flagg and J. W. White, published in the Dental Cosmos, and from which I have drawn largely.

Of the four basal temperaments, the bilious and sanguine are both accompanied by teeth of most excellent quality and resistive power. The nervous temperament dentally is not quite so good, and the lymphatic is positively bad.

Of the binary temperaments dentally, the sanguo-bilious and the bilio-sanguine present excellent organizations, the latter being of all tooth-structure the type of excellence. The nervo-sanguine and sanguo-nervous, not quite so good, are still excellent. All the

others are of fair organization except the lymphatico-nervous, the bilio-lymphatic, and the nervo-lymphatic, which, influenced largely by the lymphatic base, are of low resistive power.

The basal and binary temperaments represent but a small portion of mankind. The majority combine the attributes of three and even all four bases, and so perfect is the combination that it is difficult or impossible to assign even the teeth to their proper position in the temperamental scale.

The best teeth accompanying any temperament represent the quality type of that temperament and variation therefrom,—the temperament variation.

A cause having a bad effect upon individuals of one temperament would have the same effect upon individuals of any of the other temperaments, but not to the same extent. This refers to the organism as a whole, or to the organs separately. The splendid bilio-sanguine temperament, in its resistance to ill effects, and in its recupurative power, would be less readily changed than others of less resistive force. The teeth demonstrate this. Variations from type are not so common or so great among the higher grades of temperament, but they exist even here, and the offspring, even at maturity, rarely show the tooth-quality of the parents.

Consideration of Possible Causes.—The relative quantity of organic and mineral constitutents of the tooth is, according to almost all observers, an important consideration; the general opinion being that low-grade teeth contain less and high-grade teeth more inorganic matter; in other words, that defective organization is deficiency of lime-salts. While I have no evidence to urge against this opinion, and admit its *possible* correctness, the conclusion seems nevertheless to have been "jumped at." There are some things difficult of explanation in connection with this theory.

In well-organized teeth the dentine is much more sensitive to external impressions than in those of softer texture; a fact that carries with it a possibility of an influence aside from mere quantitative considerations. Chemical action is admittedly one cause of caries. Acids act *more* readily upon inorganic than upon organic matter; hence the *mere increase* of lime-salts could not be protective save as regards time required to consume. Lime compounds are more susceptible to chemical alteration in their free condition than in organic combination (calcoglobulin),—a fact indicating a probable influence of *method of combination.* It is doubtful if polished dentine decays more readily than enamel, but it contains much less lime. Exposed cement is about as resistive as either, with still less lime in its composition.

A chemical analysis does not show all the elements of this most

perfect combination, and, although there be more or less of inorganic matter proportionately, we are not justified in founding a theory thereon in the face of unexplained objections.

Age.—It is well known that teeth change with advance in life. The dense, yellow teeth of age are very different from the white, pearly teeth of youth. This change in *dentine* is easily accounted for. We know that there is a gradual deposition and organization of lime-salts in the canaliculi, and that these latter become almost obliterated. But the change is not confined to the dentine. The enamel partakes of it and becomes more resistive to caries. It cuts differently. The "feel" under the chisel is not the same. Not that it seems more hard, but less brittle. I know this change of enamel has been disputed, and indeed it is exceedingly difficult of explanation, the enamel organ being gone, and there being no visible connection with the pulp. The decrease with age of liability to decay must be due to enamel alteration, because this tissue is the first destroyed.

Structurally soft teeth are most frequently met with in the mouths of young people. We have all seen cases where soft, *young* teeth have become dense with advancing years. The questions naturally present: Is it mal-organization or immaturity? May not the teeth mature too slowly or not at all? What stimulus do they require to cause their normal development?

Heredity is a potent producer of constitutional defects and diseases, and we can plainly see its influence upon the teeth. Irregularities, peculiar shapes, and abnormalities are readily transmitted, and the same is true of organization. Illustrations are plenty of fine dentures in several generations of a family, but they are just as plenty of badly-organized teeth coming from ancestors of almost perfect type. Indirectly, by transmitting constitutional diseases, more especially syphilis, hereditary effects may be quite marked, but more frequently, I think, in defects of form or calcification.

Maternal Influences.—Much has been said of the influence of intra-uterine life upon the teeth; that as the mother's habits (exercise, etc.) were good, and her nourishment of the proper character, the teeth of the child were likely to be good. Otherwise the probable result would be the condition we have under consideration.

There seems to be reason for the belief that the physique of American women is not what it should be. They have too little out-of-door exercise and too little sunshine. In regard to their foods during pregnancy, all that has been said has been based upon the assumption that there was an insufficiency of lime,—a proposition that we will discuss farther on. In either case, supposing such an influence, the teeth should not be the only organs to be affected.

The bones are made up of the same materials as the teeth, and would be as readily influenced.

An interesting *speculation* in this connection is the influence for several generations of edentulous mothers. Artificial teeth are said to be a boon to the race; *possibly* they are a bane to the coming race.

Climate and Nationality.—But little can be said under this heading because of the paucity of observations. The map of Dr. Magitot of the relative prevalence of caries in different portions of France is about all we have, and it does not help us much. The differences of race would be most likely temperamental differences. Dr. Henry Sewill, of England, places the Scotch first in the rank of dental development; then the North Germans, English, French, and the people of the United States, in the order given.

Climate seems to have little or no effect. The South Sea Islanders and the Esquimaux have equally good dentures.

Habits of Life.—I am inclined to think this consideration is of greater importance than either of the preceding. I mean more especially those habits accompanying civilization, which tend to relax, in contradistinction to those of savage life, which tend to develop, the physical organism.

Physical labor, rugged life, and coarse living are more generally the rule in European countries than here. Even our poorer classes do not live coarsely. Defective organization is most prevalent among the wealthy.

Foods.—For a long time it has been stated that the cause of malorganization is an insufficiency of lime in the foods, and that bolted flour was especially productive of this condition. It is strange that such a statement could have been so implicitly accepted and believed. In the first place, it has no foundation in fact. Our tables are well supplied with food containing an abundance of lime. Even if it were true that insufficiency of lime was the cause of the disease, how could the bones escape the effects? Dentistry alone is responsible for that theory. Neither physiology nor pathology had anything to do with it.

Faulty Assimilation.—In company with the above we have had the theory that lime, although abundant, might not be assimilated. It is, like the preceding, based on assumption, and is destroyed by the same argument. The blood is the medium of supply to all the tissues of the body. It could not starve the teeth and feed the bones.

Disuse.—There is an increasing tendency to regard functional activity as a necessary incentive to tooth-development. It is argued that cattle fed upon slops for a long time are much subject to caries. The manner of cooking and serving foods, the habit of imperfectly

masticating them, and the selection by many of soft foods, do for civilized man what it is claimed the slops do for cattle.

It is certainly true that mastication is the functional exercise of the teeth, and it is also true that the teeth get too little of it.

There is no organ in the body that will withstand disuse. Each has its function. Activity develops. Idleness results in atrophy. It is probable that the teeth are no exception to the general rule; and if, as seems certain, there is development of both dentine and enamel after eruption, mastication is doubtless the stimulus that induces it. I have already spoken of immature teeth ; I do not pretend to say what constitutes the difference between old and young teeth, but clinical evidence at the chair convinces me that the difference exists. I am strongly impressed with the belief that mastication is the stimulus upon which pulp-function depends, and that its indulgence causes hardening or a tendency to early maturity of the tooth.

The teeth of tobacco-chewers are remarkable for their excellent organization. Tobacco also acts as a sialagogue, and in that way tends to prevent decay; but it is structure we are discussing, not decay, and the habitual observer can readily determine the effect mentioned.

One well-established principle of evolution is that any beneficial modification of form or structure in any organ is transmitted and intensified by heredity. The reverse is also true, and nature finally throws off what has become a useless appendage. This latter process is a slow one. There is evidence that the third molar in man is passing through this change.

In studying comparative anatomy, one can not but be impressed by the evident adaptation of the teeth to the use that is made of them, and to the character of foods they are required to handle. Nor can he doubt, if open to conviction, that use was the power that modified them. The examples are numerous, beautiful, and convincing.

My deductions are, therefore,—

First, that there is a condition of tooth-organization that predisposes to caries.

Second, that teeth at eruption are not fully matured, and that they may mature early, late, or not at all.

Third, that mastication is the stimulus tending to produce early maturity.

Fourth, that immaturity and mal-organization are similar if not identical conditions, but not necessarily having the same cause.

(To be continued.)

CLINICAL REPORTS.

HOSPITAL OF ORAL SURGERY.

CLINIC OF PROFESSOR JAMES E. GARRETSON, M.D.

Case I.—Amputation of Tongue.

The patient was a man forty years of age; disease, epithelioma of right side of tongue; operation to be practiced, removal of one-half of organ from middle line to root. Means to be used, écraseur and strangulating ligature.

Prof. Garretson commenced the manipulations by attaching the chain of an écraseur to a ligature, the length of the latter being twice that of the former. The two fastened, the thread was passed through the eye of a silver probe.

A succeeding step was the looping of the apex of the tongue, and while the organ, by means of this convenience, was drawn out from the mouth and held up, a delicate, long-bladed, curved bistoury was passed from below upward and backward, perforating it. The knife being retained in place as a guide, the probe was carried through the slit, thus giving command of both the ligature and chain, as these in turn were made to follow the probe.

A concluding step was the fixing and retention in position of chain and silk, a matter accomplished without difficulty through the use of transfixing pins of much strength curved on the flat.

Chain and ligature in place, the first crossing the base of the tongue and the second along the median line from root to apex, strangulation by degrees was commenced. In ten minutes the chain had cut its section without hemorrhage, and in fifteen the silk was through; but in the case of the latter the result was not so clean, two arteries springing with much force, and which, while held by the operator, were secured by Dr. Cryer, chief of clinic, threads of delicate silk being used and cut off close to the knots.

In three days this patient was sufficiently recovered from the operation to go where he pleased about the building.

Saturday, July 18, some ten weeks later, the patient showed his mouth to the class, exhibiting perfect freedom from disease, while the change made in the shape and size of the tongue was without observable effect on his speech.

Case II.—Epulic Growth in Child-Bearing Woman.

Particular attention was directed to this case, as exhibiting a rare condition, which should be held in mind by all practitioners, as said the speaker.

The mouth of the patient being opened, a fungous growth, as large as the terminal phalanx of the thumb, was seen occupying the alveolo-buccal aspect of the right jaw, showing a broad peduncle related with the dental pits of the last two molars. The mass bled freely on slight touch, and was possessed of a decidedly malignant appearance. The patient was seven months *enceinte*, and the tumor had started three months back.

While, as remarked by the lecturer, it would seem desirable to extirpate thoroughly such an angry-looking tumor as quickly as possible, yet happily the condition is entirely without danger, and it is seldom longer than three months after delivery before such growths are found to disappear of themselves. In the meantime, excessive proliferation, which might go on to such an extent as to partially fill the mouth, is to be antagonized by a liberal use of London paste, applied as for removal of the tonsil glands.

Asked if a woman in the family way might not have a true neoplasm, Prof. Garretson answered that distinction lay in observing the loose fungiferous aspect of the non-malignant growth, in the history of a case, and in the story told by a microscope.

To quickly relieve the patient in the present case, the tumor was cut off at the pedicle, and the part touched with the paste, applied in the cup of a director.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION—TWENTY-FIFTH ANNUAL SESSION.

The twenty-fifth annual meeting of the American Dental Association, which was held in Curtiss Hall, Minneapolis, Minn., commencing Tuesday August 4, 1885, was one of the most successful, from whatever point the view is taken, in its history. The attendance in numbers has been equaled but once; the personnel of the members was of the highest character; and last, but not least, the papers presented, almost without exception, were worthy to be read before the highest representative body of dentists. The large attendance was mainly due to the efficient work of President J. N. Crouse and his coadjutors of the Executive Committee and the Local Committee of Arrangements. The great majority of the Eastern and Southeastern delegates gathered at Chicago, whence they were conveyed by special train over the picturesque route of the Chicago and Northwestern Railway. Over two hundred practitioners of dentistry with their families occupied the ten cars of which the train was composed. Leaving

Chicago at 9 o'clock in the morning, most of the journey was accomplished by daylight, so that those who were strangers to the great Northwest were enabled to get a vivid idea of its resources and beauties.

The dentists of Minneapolis were untiring in their efforts to make the stay of their guests agreeable. Between sessions they busied themselves in convoying small parties to the different points of interest in and around the city. Their crowning act of courtesy was an excursion to Lake Minnetonka, tendered by the Minneapolis Dental Society to the members of the American Dental Association. A special train to the shores of the lake was provided, leaving Minneapolis at 3 o'clock Friday afternoon. Arrived at Lake Park, the excursionists were taken on board the Belle of Minnetonka, which steamed slowly around the lake to give the guests an opportunity to enjoy the constantly changing panorama of magnificent scenery, and returned to the Lake Park House shortly before nine o'clock in the evening. Here an elegant dinner had been provided for 350 persons, nearly all of whom were present with their appetites when the signal to fall to was given. Toasts were read and speeches made. Dr. W. A. Spaulding, president of the Minneapolis Dental Society, acted as toast-master, and Dr. J. H. Martindale delivered the address of welcome. Speeches were also made by Drs. H. M. Reed, E. T. Darby, L. C. Ingersoll, J. Taft, C. W. Spalding, W. H. Atkinson, and E. Parmly Brown. At the conclusion of the banquet the special train conveyed many of the participants back to Minneapolis, but many others remained to enjoy the dancing festivities, the music for which was furnished by the orchestra which had accompanied the excursion in the afternoon.

First Day.—*Morning Session.*

The association was called to order by President J. N. Crouse, of Chicago.

The session was devoted to routine business. The death of Drs. Isaiah Forbes, of St. Louis, and J. G. Ambler, of New York, members of the association, was announced, and a committee, consisting of Drs. J. Taft, C. W. Spalding, and W. H. Atkinson, was appointed to prepare a suitable memorial.. The committee was also instructed to report a suitable minute of respect relative to the death of General Grant. Dr. T. T. Moore offered an amendment to the constitution, changing the time of meeting from the first Tuesday in August to the fourth Tuesday of the same month. Laid over under the rules.

Adjourned till 8 P. M.

Evening Session.

President Crouse called the meeting to order pursuant to adjournment.

Dr. Peirce reported from the Executive Committee that they had decided to set apart Friday afternoon for the enjoyment of an excursion to Lake Minnetoka, tendered to the members of the association by the Minneapolis Dental Society. After Dr. A. T. Smith, of Minneapolis, had outlined the trip, the report was accepted and adopted.

Dr. Peirce, from the Committee on Volunteer Essays, reported that they had examined three papers, which they recommended to be referred as follows: "Pyorrhea Alveolaris: Sponge Grafting," by W. H. Atkinson, to Section VI; "The Alveolo-Dental Membrane—Unity or Duality, Which?" by Dr. L. C. Ingersoll, to Section V; "The Painless Operation," by Dr. J. A. Robinson, to Section IV.

The report was adopted.

President Crouse stated that the time had now arrived for the delivery of the president's annual address, according to the usual custom, but he had simply to say that he had no annual address to deliver. The time which should have been devoted to its preparation had been put in, as he hoped, to better advantage for the association. (Applause.) An address would almost necessarily be to some extent a re-statement of what had been said by others, and, in his opinion, the time of the association could be better employed than in listening to it. There were, however, one or two matters which he would like to bring to the attention of the association. Much of the time at the annual sessions is taken up in getting the work of the Sections ready for the association. He would recommend that as much as possible of this work be done before the time of meeting. The association is now in financial condition to stand some of the expense of the Section work, perhaps in the direction of original investigation. Money thus expended would forward the legitimate business of the association.

Section VII, Physiology and Etiology, was called, and a brief report was read by Dr. A. H. Thompson, secretary of the Section, submitting a paper by Dr. W. C. Barrett, of Buffalo.

Dr. Barrett then read his paper as follows:

The Earthy Phosphates.

The administration of the earthy phosphates to pregnant women and to young children has been a favorite prophylactic method of treatment with many intelligent dentists. The theory upon which

this system was founded is that decayed or defective teeth owe their condition to trophic disturbances, and that it is but necessary to supply the missing elements in order to produce perfect dentures.

The theory is a very plausible one, and it gave credulous practitioners excellent opportunity to enlarge upon the wonderful process of gestation, and the marvelously interesting double function of the expectant mother, whose digestive apparatus must furnish not only pabulum to sustain her own physical being during a trying period, but substance to the fetal man or woman which she carried, beneath her heart. If her own teeth decayed during the period because of the neglect that at such times is common, she was perhaps treated to long dissertations upon the imperative demands of the growing fruit of her uterus, which, not finding the needed elements in the blood with which she supplied it, was robbing her own osseous system to supply its wants. If her teeth were found to be soft, it was because their character had changed, and the lime-salts of their crystalline structure had been taken out to build up the young child. Corroborative evidence, when looked for with biased judgment, was not lacking, and dentists had many tales to relate of the most stupendous changes effected in the dental development of children through a judicious administration of the lacto-phosphate of lime to the mothers during pregnancy. The instances in which such results seemed apparent were cited, while those in which no effect resulted were not included in the category, or were attributed to a want of faithfulness in taking the prescription. We believe that which we desire to believe, and there is no difficulty in finding apparent confirmatory evidence to sustain the most absurd of postulates when one sets out with a determination to do so.

There is probably no one who has followed the prescribing of the earthy phosphates for a supposed dystrophic condition who will not, if his memory be refreshed and his data perfect, call to recollection very many failures. If he shall have traced the after history of children born of mothers who during pregnancy were subjected to the phosphatic treatment, he will probably find quite as many with defective teeth as in those who were born under other conditions. Earlier in my own professional history I experimented with the different preparations in numerous cases. One of the first of these was that of a lady pregnant with her second child, the first being in a deplorable dental state. The seeming results were amazing. Not only was her gestation more pleasant and easy than the former one, but the dentition of her infant was almost entirely without the usual febrile disturbances, and the child's teeth, up to the time when I lost sight of him through the removal of the parents, presented a remarkable contrast to those of his elder brother. This case would possibly

have confirmed me in the use of the phosphates were it not that about the same time I had contrary experiences. In one notable case, that of a lady pregnant with her fifth child, I persuaded her to a thorough course of my then favorite remedy. All the other children had excellent teeth, their dentition being much above the average. There was no special reason why she should be subjected to prophylactic treatment, except that I fancied I saw disastrous effects impending to her own teeth, from what I presumed to be an abnormally soft condition, and because I was at that time pushing this investigation with strong hopes that I had hit upon a means by which a perfect dentition might be assured to every child. As time rolled on I beheld the direct antithesis of the first-cited case. The child had all manner of difficulty in getting its teeth, and when they were in place I saw, to my confusion, the only really bad denture in the family.

Of all the women whom I subjected to this treatment, there was not one in which the experience of the lady of the first instance was repeated. That case was, no doubt, an accidental one, and the results were due to something besides the lime treatment. Experience alone led me to entirely adandon the practice, and when subsequently I made a more thorough study of the physiology of nutritrition, I became confirmed in my skepticism concerning the utility of the feeding of phosphates to pregnant women, or even the indiscriminate recommendation of such foods as are particularly rich in earthy materials. The facts are against it.

A few years since it was common to hear denunciation of the use of fine flour, from which it was declared that the miller had eliminated all that was of use in the building up of the bony system. Elaborate papers have been read before this association in which it was demonstrated to the satisfaction of the really thoughtful and honest essayist that the decay of teeth, which was supposed to be a modern disease, was due to the lack of phosphates in the fine flour that formed the chief article of subsistence, Since then computations have been made of the amount of bone-making material that is found in the finest of wheat flour, and of the amount that is needed by both mother and fetus during gestation, and it has been demonstrated that, should she live entirely upon this article of diet, there would still be an excess of the lime-salts. It is a fact that during pregnancy there is almost universally a continual elimination of these principles, which are easily traced in the excretions. Any pregnant woman who lives upon almost any diet that is sufficient to sustain life will, if the nutritive organs be in proper condition, find more than is necessary of these elements to keep the system in proper condition. It should be remembered that the nutritive

changes in the bones and teeth are less than in the other tissues of the body, because they are more permanent in essential structure and character. Especially is this the case with the teeth, in which the trophic changes are very limited indeed. That such a dystrophy may exist as shall materially affect these organs, no one will probably deny; but the process will of necessity be but a slow one, and the changes will not soon be manifest.

And now let me detail some of the physiological reasons why the giving of the earthy phosphates for nutritive purposes must be a mistaken treatment, and why, to my conception, it is based upon erroneous assimilative views.

All pabulum must originally be derived from the earth. That is the primal source of all nutritive material. But there is no order or class in the animal kingdom that can elaborate it. There is no animal organism that can derive nourishment directly from earthy matter. That function rests solely in the vegetable kingdom. Animals are not primal organizers. They cannot digest the inorganic. They require organized structures for their food. The study of vegetable physiology shows that these alone have the ability to assimilate inorganic matter, and out of earthy material to organize tissue that shall serve as food for the higher orders. When matter has once been organized into vegetable products it may serve for the sustenance of animals.

Some of the animal kingdom subsist upon matter that is but one remove from the inorganic. To this class belong the Graminivora. Other animals require that their food shall have been twice organized; first from the earth into a vegetable form, and again by an animal into a higher form. To this class belong the Carnivora, which cannot digest or assimilate vegetable organisms until they shall have been reorganized into an animal.* Others are omnivorous, and their digestive apparatus will prepare nutritive matter that has been but once organized into vegetable life, or that has been again organized into animal existence. To this class belongs man. But neither he nor the Graminivora can make nutritive use of inorganic matter any more than can the Carnivora. It follows, then, that if inorganic matter be introduced into an animal organism it is entirely foreign, and must be eliminated in an unchanged condition. If it remains within the system, it is essentially and must ever be a foreign substance, an irritant, that, if not promptly rejected, will create internal disturbances of a more or less serious nature. All inorganic

* It is a rather singular fact that most of the animals that require their food twice organized are unfit for food themselves. Their flesh is rank, unpalatable, and innutritious. There are exceptions among fishes and birds, but of the mammalia the flesh-eaters are themselves uneatable.

matter, then, is foreign to the animal system, and, so far as nutrition goes, it is not only entirely useless, but absolutely mischievous.

It is true that certain toothless classes, which are provided with a proventriculus, swallow inorganic crystalline bodies, but these answer only a mechanical purpose, in assisting to triturate the food, thus adventitiously serving in place of dental organs. The small stones in the gizzard of the fowl are foreign bodies, which play no part in assimilation.

Some of the proximate principles of animal bodies are made up mainly of inorganic material, but they never exist as simple substances, unless in the case of the iron of the blood, if that be a proximate principle. That exists only in a kind of solution, held there by the other constituents, and it is not assimilated directly. The calcium of the bones and teeth exists in combination with other substances, and it is never assimilated directly, but it is elaborated and the combination formed within the system. The carbonate of lime and the phosphate of magnesium are not taken up as such, but the carbon, the phosphorus, the calcium, and the oxygen are elaborated within the organism, and their chemical union is there completed when they are built into the tissues. The building of this animal house of ours cannot be brought about by feeding bricks and mortar. The raw material must be furnished in other compounds, which it is the province of the nutritive apparatus to disorganize, to separate into their constituent elements, and to re-combine into tissues. Every particle of tissue principle must be elaborated within the body, and built up, not from compounds, but from simple elements. If carbonate of lime be needed for the teeth, it is of no use to feed oyster-shells. The system will not take carbonate of lime, but it will elaborate the material from the calcium, carbon, and oxygen that it derives from food, and it will take its carbonate of lime in no other way. It is the same with the phosphates, and hence the inutility of giving any preparation of that material which cannot serve as pabulum. So complete and perfect is the nutritive process in the healthy organism, and so universally and admirably are the elements provided in all organic matter, that a perfect digestion will find in any material that is fit for food sufficient of the different ingredients to elaborate into pabulum for all the tissues. Were not this the case, it would be impossible for the different races to exist under all the varying conditions in which they must live. The dweller in the hyperborean regions of the far North, where vegetable life scarcely exists, must make a subsistence almost exclusively out of an animal diet. But his whole system is as well nourished as is that of the omnivorous dweller in the temperate regions. There are those who live upon an exclusively vegetable diet, and none of the tissues are

starved. People have subsisted wholly upon fruits. Yet every organ was perfect, because of this universal diffusion of the elements of nutrition. The simple substances of which the body is composed are comparatively few, and are found everywhere. Were it otherwise,—were it the case that the organism is unable to elaborate its compounds from the elementary substances; were it the fact that carbonate of lime and fluoride of calcium and all the compounds must be supplied as they exist,—it can readily be seen that animals could not subsist upon a simple diet. It would be necessary to supply such foods as contain the exact compounds needed, and this, except under the most favorable conditions, would be impossible. Hence but a very small proportion of the earth's surface would be habitable, and most orders of animals would become extinct through inability to obtain the exact compound needed for so complex a nutrition. The laws governing our existence are simple, if we would but study them intelligently. Animal life can subsist upon almost any kind of organic matter not absolutely poisonous, and yet be well nourished.

Inorganic matter does, however, play an important part in the human economy, but man is the only animal that makes any extended use of it. Many inorganics act as special irritants or excitants to definite organs. Their very presence in the system may induce certain structural or functional changes, and thus, in abnormal conditions, they may play an important part. When they are administered for any such purpose we call them remedies, and man is the only animal that employs them. Our medical pharmacopœia is largely made up of inorganic matter, to be given for the purpose of inducing certain changes corrective of others brought about by dystrophic conditions. If intestinal function ceases through the presence of innutritious or indigestible matter, an inorganic remedy may by its mere presence induce such violent peristaltic action as to eliminate the obstructive matter. Alterative effects follow the ingestion of some inorganic substances, but it should always be remembered that such matter is foreign to the organism, and is always extruded at the earliest opportunity. It takes no part in nutrition, and is never built up into the tissues. I believe it to be a general rule in physiology that inorganic matter introduced from without is always foreign to the system, and it is always eliminated as soon as possible.

It must follow, then, that the giving of the inorganic earthy phosphates for nutritive purposes is always a mistake. If they act at all it must be remedially, and if they are to be so used they should be intelligently prescribed, like any other agent, and only for their medicinal properties. I have no knowledge that they have

any very decided medicinal virtues, and therefore I can see no excuse for dispensing such inert compounds.

Section VII was declared open for discussion.

Dr. C. W. Spalding, St. Louis, thought it very clear, as a rule, that inorganic substances cannot be assimilated as such in the animal organism, but after they are organized into vegetable forms they can be assimilated. But there is one exception to this rule,—an inorganic substance in very general use,—sodium chloride. We know that it is eliminated unaltered in the excretions, but we do not know that it is all eliminated. That which remains in the system must undergo some decomposition, and, if so, why are not the elements of the portion so decomposed capable of being incorporated into the system? We know some animals in a state of nature do seek for salt. The deer's visits to the salt-lick are a familiar example. Is that a perverted taste which prompts them to use salt, or is it one implanted in them by nature? So of some of our domestic animals. They will not flourish, but will get out of condition, when deprived of their portion of salt. Now, for what purpose do they require it? Is it remedial? The taste for it may be acquired in domestic animals, but it is not so in the wild.

Dr. C. N. Peirce, Philadelphia, agreed with much contained in the paper, but ideas are expressed in it which are antagonistic to the laws which govern organization and assimilation. Dr. Barrett expressed the idea that man is the only animal that requires remedial agents not of the same character as his food. Yet the horse eats clay; the dog eats grass. The cat and the dog both eat their modicum of grass every day. All familiar with the poultry-yard know that if the fowls are deprived of oyster-shells their eggs will be laid without shells because of the lack of lime in their food. We are mystifying ourselves by speaking of inorganic and organic. The lime in the wheat-straw, which grows only by virtue of the lime in the earth, is no less inorganic than when taken into the animal economy through drink. All who are familiar with agriculture know that the land must have lime or there will be no growth. Farmers have lately come to sow salt on their oats land. The question is one of appropriation. Dr. Barrett's experience as related is not conclusive. The speaker contends that great benefit is often conferred by giving lime-salts,—not through their assimilation, but by the assistance which they give in changing the conditions of the fluids of the body. Dr. Barrett puts the cart before the horse when he says that diet is made for the animal. The fact is that diet makes the animal, determines its structure. You can take animals and keep them on food different from that which is natural to them, and in

the course of generations you can adapt them to the new diet. The teeth result from the food habit. There is the same structural development throughout each class, whether the animals are terrestrial or aquatic, because they have the same food habit. In the Carniora the teeth are modified by changes in the diet. The polar bear, whose diet is exclusively flesh, has the typical carnivorous teeth; the bear found in Kentucky lives partly upon berries and roots, and its teeth are modified accordingly. The last has a grinding molar produced by the influence of the herbivorous diet upon the carnivorous teeth. We often see children placed at the table with a cup of fluid by their plates, from which they drink from time to time, washing the food into the stomach unmasticated. Wherever this course is pursued the teeth are weak and break down, because their functions are delegated to the stomach. This loss of function is the cause of their disintegration, rather than any change of diet, and so we have almost universal dental caries.

Dr. W. H. Atkinson, New York. It is but a very short time since Dr. Barrett was the advocate *par excellence* of the administration of lime-salts. It is a very easy thing to find corroborative evidence when you want to prove anything, and not to find what is opposed to it. It is this wrong classification by which we are bewildered that causes all this discussion. The first thing is the classification into organic and inorganic. The speakers have mentioned two organic substances and called them inorganic,—water and common salt,—and the last has been spoken of as though it were the only salt. They have also spoken of remedies and foods. Any substance that can cause a change in the arrangement of the atoms of organism may be food, poison, or medicine, according to the conditions under which it is presented. Until we shall have some knowledge of how pabulum is produced, and what it is that makes what is a food at one time a poison under other circumstances, we shall not approach a solution of the difficulties in our way. It is difficult to show the right when there are so many assumptions and so few facts, while the assumptions are held to be as valuable as the facts.

The assimilation of pabulum is the awakening of a latent energy. We say we are hungry, and we are fed; and almost everybody says we are hungry in the stomach. We are hungry just where the pabulum is burned out. One gentleman says salt is passed through the animal organism unchanged. He had better revise his animal chemistry. You might as well say that air is eliminated unchanged from the lungs, when ninety-six per cent. of it is killed, and we only appropriate four per cent. The oxygen of the ninety-six per cent. is absolutely dead, so far as its usefulness as food goes. Another gentleman says the food habit is the mother of the tooth-

forms, forgetting that it is the awakening of the energy which assimilates and places the food supplied which makes the forms of the teeth.

Dr. Spalding. Did Dr. Atkinson say that the salt was passed unchanged?

Dr. Atkinson denied having said so. His analogy of the oxygen showed that he did not believe it, even if he did not say so. It can be proved only by analogy. The oxygen elimination has been tested, and the salt also to a lesser extent.

Dr. Abbott, several years ago, had gone through the same experiments with pregnant women as Dr. Barrett, with the idea of producing better teeth for the children, but he did not get good results. In one case he thought he had succeeded, but he now knows that the teeth produced with the lacto-phosphate of lime treatment are no better than others in the same family where no treatment was tried. However, he had not yet given up the idea that we possibly may get good results in this way. The difficulty is in the way in which the lacto-phosphate is administered, and seems to be that all that we administer is not really lacto-phosphate of lime, but a solution of three parts lime and one part phosphorus. All our efforts seem to fail unless the lacto-phosphate is in the form of a food. We take into the system in all forms of food which are presented sufficient lime for all structural purposes, but a partial reason for the decay of the teeth in pregnant women may be the fact that they are unable to assimilate a proper amount to supply the drain on their systems, even if they take it, because they throw off so much by nausea.

Dr. Peirce. Dr. Atkinson referred to a point which the speaker wished to make clear—the formation of the teeth by the food habit. If you will go into a museum of comparative anatomy and with a pair of dividers examine the jaws and teeth in the skulls of animals of different classes, you will find, as was first shown by John A. Ryder, that in one class the odontomorphic center is at the condyles, and in another class the center will be between the condyles, showing that the motion of the jaw in the trituration of the food has controlled the valleys and cusps of the teeth. Then again, the three hard tissues of the teeth are arranged differently in different animals, according to the food habit. In one group we have the enamel outside of the dentine covering the crown and the cementum covering the dentine of the root; in another group the dentine and enamel are side by side, and so on.

Dr. L. C. Ingersoll, Keokuk, Iowa. Did Dr. Peirce say that the forms and functions of the teeth arise from the food habit? If so, he would like to ask two or three questions. First, Whether the formation of the stomach is the result of the development of the

teeth? Then he should like to ask if the habit of cud-chewing is the mother of the double stomach of the bovines?

Dr. Peirce. Necessity goes before motion. He admitted that the subject is involved in much obscurity, but he adhered to his statement that the food habit is the mother of the structure of the teeth. The nearer the food approaches to the animal the shorter will be the process of its transformation into that animal's tissues. Thus the sheep, which is truly herbivorous, has an alimentary canal twenty-eight times as long as its body; while in some of the Carnivora the canal is only five times the length of the body.

Dr. Ingersoll. We understand that the teeth and stomach of the child are developed contemporaneously. Now, the question arises from what Dr. Peirce has said, if the child has no teeth, will it have no stomach? A well-authenticated case has been reported of a man in Pennsylvania, over forty years of age, who never had any teeth, but has a good sound stomach, so far as heard from.

Dr. G. D. Sitherwood, Bloomington, Ill. Reading and observation accord with the views put forth in the paper. There are exceptions, of course, but we are putting too much confidence in the feeding of mineral substances. He had no faith in mineral salts or patented mixtures which it is claimed are going to make better teeth.

Dr. S. H. King, Lincoln, Neb. Dr. Atkinson assumes that when one is hungry, the hunger is not in the stomach but in the part that wants food. The speaker's experience was that when hungry, if he filled the stomach, the hunger left him. Now, can it be that the part is satisfied at once?

Dr. Atkinson. The proof that the hunger is not in the stomach is that you will not be hungry if you will put on a belt so as to send the blood with the contained food to the part that needs it. The effect is just the same as the distention of the stomach with food.

Dr. Barrett was well aware that the members of the association are rather discursive. A single subject had been presented. We have not come here, some of us a thousand or fifteen hundred miles, to discuss elementary principles. Those who take part in the discussion should have their minds sufficiently expanded to comprehend the limits of the subject under consideration. Taking the last speaker as an illustration, he would ask, is not the body sustained for months by enemas? Again, there is a demand in the organism for fluids. The thirst can be appeased by injecting fluids into the venous system.

The nomenclature of the subject is deficient and unsatisfactory. The division of elementary substances into organic and inorganic is especially unsatisfactory. Water itself is inorganic, but it is found throughout the body. In the absence of a correct terminology we

must employ terms which are in common use, and he wished to be understood as using the terms in their accepted signification. He desired to lay it down as a general law that under no circumstances can animal organisms use inorganic substances for the production of trophic (nutritive) changes. One exception has been cited as triumphantly refuting the law which the speaker believes to extend throughout the physical kingdom,—the feeding of lime necessary for the production of the egg-shell. The shell is no part of the egg. Some eggs are incubated within the body; some without. Those which are incubated within the body have no shell; the shell is merely a covering for the protection of those which are deposited before incubation. Dr. Atkinson has answered some of the arguments that chloride of lime is necessary for the building up of the osseous system. There are various substances which are not built into the body, which form no part of its structure, but which are useful in keeping the solutions within the body in proper condition. Chloride of sodium is necessary to endosmosis and exosmosis, to change the conditions of the fluids so that those processes may go on. Referring to the statement that has been made here that the alimentary canal of the Carnivora is five times the length of the body, while that of the Graminivora is twenty-eight times, what does it prove? It proves, if it proves anything, that the higher organized the food is the shorter is the alimentary process needed for its assimilation. Dentists have been too much in the habit of prescribing the phosphates for building up the system of the mother. He believes that it is of no use to prescribe them ready made. Nature must elaborate them from their combination with the other elements of the food or she will not use them. If nature needs carbon she will eliminate it from its combinations, but she will not take a compound and build it into the system as a compound.

Dr. Peirce. It is a well known fact that the rocks of Paris and Gibraltar are composed of little infusorial animals and their products. These are organized.

Dr. Barrett. Does Dr. Peirce call the product of the infusoria or the coral insect organized?

Dr. Peirce. As much so as in the wheat straw.

Adjourned till 9 A. M. Wednesday.

SECOND DAY.—*Morning Session.*

The association met pursuant to adjournment. President Crouse in the chair.

Dr. Peirce moved the appointment of a committee of three to consider the suggestion of the president as to the expenditure of money in the direction of original research.

The discussion of Section VII was resumed.

Dr. W. H. Morgan, Nashville, wished to refer to one or two points that had been brought out in the discussion. It has been stated that the peculiar character of development we see in different animals is the result of the food habit. The speaker apprehended that that depends on a pre-existing typal form. It may be modified by the food, but the food has nothing to do with the determination of the typal form. Wherever a want is expressed in the animal economy, it is a promise that that want is to be supplied. Take the poorest food that man can exist on, and it contains enough lime to build up the osseous system. He would confess that he was somewhat uncertain about the organic and inorganic. He did not know but that potentiality was conveyed to mineral matters after they are in the animal system, and he was not prepared to take the broad ground that it is impossible to take mineral substances into the organism and incorporate them with it; but he was sure there was no necessity to go outside of recognized foods to get the lime necessary for the bony skeleton. Take the ordinary cereals as food, and in seven years you will have taken into the system many times as much lime as is necessary to renew the bony system, and what is not used is thrown off. This of course applies to the healthy body. But behind all is the question of assimilation. When that is regulated we will cease to be bothered as to how much lime-salts is required and how to give it.

Dr. J. J. R. Patrick, Belleville, Ill. All readily recognize the fact that there are two great kingdoms in nature, the organic and the inorganic, which are divided up into three, the mineral, the vegetable, and the animal. It is well enough to call attention to the order of succession of these three: first, the mineral, because it is impossible for the mind to conceive of the vegetable without the mineral as its forerunner; in the same way the animal succeeds the vegetable. We do know the broad fact that the mineral must exist before the vegetable, the vegetable before the animal; the consumed must preëxist the consumer. All agree on one fact, that the vegetable elaborates the material of its growth from the mineral,—stores it up, as it were, in its structure,—and that the animal elaborates its muscles and tissues from the vegetable. Once it is stored up, other forms than the simpler ones can exist upon it. In the animal kingdom the vegetable-eaters must preëxist the Carnivora. There is nothing to make the animal structure except the proximate principles found ready stored up in the vegetable for the growth of the animal. The chemist has never succeeded in elaborating these proximate principles, but the alchemists always looked forward to the time when they could construct a man in their laboratories. A

mineral cannot be food for an animal until it has passed through the vegetable. Chloride of sodium taken into the stomach passes off as it comes in. He does not know all of its uses in the system. It is to some extent a stimulant, and after its work is done it passes off, it may be with other substances, but it is not taken into the system. A tooth, when worn, is incapable of repair. When once built—which is after the manner of any other bone, in that it is formed in a matrix, though the similarity ceases there—it is built for all time. The tooth hardens at the periphery; the pulp is the remains of the original formative organ. Bone hardens in the center first. The process in one is centripetal, in the other centrifugal,—just the opposite of each other. The tooth stops its own way to any repair. The cementum of the tooth can be repaired, but the dentine, if broken above the pulp, cannot.

Dr. A. H. Thompson, Topeka, Kansas, wished to direct attention to a few simple points not brought out in the discussion as they should have been. The whole thing turns on changes in the protoplasm. The vegetable elaborates the proximate elements from the mineral, and the animal appropriates them to its own uses. We know nothing of the process of elaboration, but we can appreciate the process of appropriation. All animal tissue is but modified protoplasm. Man differs from the amœba by modifications of protoplasm. Every tissue is but protoplasm in which other matters are deposited; or perhaps it would be better said that other matters hold the protoplasm. Vegetable protoplasm contains about forty proximate elements. Animal protoplasm has never been analyzed. Vegetable protoplasm is almost constant; animal protoplasm varies greatly. The whole question turns on the ability of animal protoplasm to appropriate the mineral elements. In regard to the administration of mineral substances, while he did not believe that much could be accomplished in that way, there is another matter to be considered. We cannot, with any certainty, direct what we administer to the parts needing it. All the formative and nutritive organs have a selective power, so that they select from the pabulum the food which they require. Lime is found in all the tissues. Then, again, there is the matter of assimilation, which, after all, is the great thing in nutrition. A part may have no power to assimilate its proper elements from the blood, and thus it may have disease.

Dr. Spalding desired to say that he was either unfortunate in his choice of words or his statement was misunderstood. The point he intended to make was that chloride of sodium is taken into the system, and the most of it passes out unchanged, and he raised the point that we do not know what proportion of it is retained in the body.

Dr. E. T. Darby, Philadelphia. Dr. Barrett said that inorganic

substances are not appropriated by the animal system. It seemed to the speaker that he could recall instances where there is a demand for inorganic substances, or at least a hunger for them. A physician, speaking to him of a child with rickets, said it had torn the plastering off the walls by its bed for a space of two by three feet, and eaten it. He suggested the use of lacto-phosphate, and the physician told him that after a short course of the lacto-phosphate the child stopped eating the wall of the house. It may be said that this was an example of abnormal appetite. Why does the anemic school-girl eat her slate-pencils? Why does the pregnant woman long for lime-containing substances? One swallow does not make a summer; neither does one dose of lacto-phosphate change the character of the teeth. If you do not get the desired result at once, you must not therefore conclude that the treatment is of no use. Prof. Agassiz, as is well known, was an ardent advocate of a fish diet for brain development. Passing with some friends through a fishing settlement, they came upon an idiot boy. On inquiry it was found that the boy had lived there all his life and his diet had been largely fish. He was pointed out to Agassiz as a fine illustration of his favorite theory. "Yes," said he, "but there is no telling what he might have been if he had not been eating fish all his life." So we cannot tell what the teeth might have been if our patients had not lived on a diet largely composed of the phosphates.

Dr. Atkinson was happy in the fact that the American Dental Association has come to its mind and is beginning to investigate principles. His view of the matters under discussion has much in common with nearly every speaker. As to the function of iron in the economy, while it is conceded to be necessary, it is not known that it bears any part except as a coloring or as effete matter. Oxide of iron is a constituent of blood in the first measure. It is converted into the sesquioxide of iron, and its office is to invite the oxygen to remain about the red corpuscle.

The subject was passed.

(To be continued.)

The annual election was held Friday morning, August 7, 1885. The following were elected officers for the ensuing year: W. C. Barrett, Buffalo, president; L. C. Ingersoll, Keokuk, Iowa, first vice-president; A. T. Smith, Minneapolis, second vice-president; Geo. H. Cushing, Chicago, recording secretary; A. W. Harlan, Chicago, corresponding secretary; Geo. W. Keely, Oxford, Ohio, treasurer; A. M. Dudley, J. N. Crouse, and A. H. Thompson, executive committee.

The new president was installed, and briefly returned thanks for the honor conferred.

Drs. A. W. Harlan and E. T. Darby were appointed to serve as members of the Publication Committee in conjunction with the secretary.

The selection of the next place of meeting was, on motion of Dr. Atkinson, left to the Executive Committee, to report through the dental journals and by circular to all members not later than the 1st of March, 1886.

The Local Committee of Arrangements will be appointed by the president after the announcement of the place of meeting.

NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a regular monthly meeting, June 16, 1885, at the house of Dr. Charles Miller, No. 331 Madison avenue.

The president, Dr. William Jarvie, in the chair.

J. Edw. Line, D.D.S., Rochester, N. Y., read the following paper on

Considerations Incident to Nasmyth's Membrane as a Medium of Osmose.

Descriptions of the cuticle of enamel date from Nasmyth, after whom it was named and is still called. Possibly it was known before his time as a something belonging to teeth, but if so known it is quite certain that nothing like definiteness attached to the fact of its existence until Nasmyth himself presented his views in a somewhat elaborate form in 1839, since when it has received more or less attention from Huxley, Waldeyer, Magitot, Kölliker, Tomes (father and son), and several on this side of the Atlantic whose views are still scattered through the various periodicals devoted to dentistry. In each and every instance, however, the question is histological, and without even the most remote reference to practical considerations,—assuming for the moment that it possesses a value involving considerations of that kind.

As the name given it by Kölliker implies, this cuticle is of or belongs to enamel. At the same time the most modern interpretation of its nature—that it is cement and continuous with the tissue covering the root, or, as further suggested by Tomes, continuous with a tissue covering the cement of the root—places it in close relationship with dentine, as in the enamelless teeth (not membraneless, however) of certain of the fishes.

Nasmyth regarded it as "persistent dental capsule." Huxley described it as being "identical with the membrana præformativa," which is objected to by Tomes on the ground of there being "no

such true membrane * * * in the place in question,"—that is, over the "dentine papilla prior to the occurrence of calcification." Waldeyer holds that it is "a product of a part of the enamel organ." Magitot, "in his most recent paper on the subject, gives his adherence to the view that it is cementum." Kölliker regards it as "a continuous and structureless layer furnished by the enamel cells after their work of forming the fibrous enamel was complete; a sort of varnish over the surface, as it were," which "would not," according to Tomes, "account for the occurrence of lacunæ in it." Tomes (C. S.) is "inclined to regard it as young and incomplete cementum," a view in which he says Magitot "entirely concurs," and which has also the support of Wedl. Heitzmann describes and pictures it as epithelial structure, not very distantly related to the epithelial layer of the gum. Williams believes it the outer of "two layers of prismatic cells * * * transformed into a stratified layer," which "becomes Nasmyth's membrane;" and, finally, Andrews, whose too infrequent contributions on histological and kindred subjects characterize him as a conscientious and conservative investigator, says: "Nasmyth's membrane is a layer that forms a covering over the enamel of a newly-erupted tooth. It is probably formed by the organ which forms the cementum, and is about $\frac{1}{20,000}$ of an inch in thickness. When raised from the surface of the tooth, it is found to be full of indentations, into which fitted the ends of the enamel rods. It has, after the most searching investigation, been found to be a continuation of the layer of cement. Lacunæ, which are found in the cement of the root, have been found in the thick portion of this membrane between the cusps of the crown."

Nasmyth's membrane, then, may be found covering the crown of at least any unworn enamel-covered tooth. It may be lifted therefrom by any acid capable of dissolving the inorganic matter as it exists in the tooth; it may be examined microscopically either from its edge or from its peripheral or central aspect. If examined from its peripheral aspect with a wide-angle or fairly wide-angle immersion objective, its surface will be found to be perfectly smooth. If, however, the examination be made from the central aspect, careful downward focussing will show a mesh-like figure identical in outline with that of the enamel-rods or prisms when seen in transverse section. Further downward focussing with the objective in question will bring into view the converging surface-lines of each of the cup-like depressions which characterize this surface of the sheath constituting the membrane in question. A feature not especially mentioned elsewhere, so far as we now call to mind, is that the borders or edges of these cup-like depressions are broken, ragged, and of varying height, and not, as usually pictured diagrammatically

and in drawings, with well-defined, sharp, knife-like edges, suggestive of simple dipping of tissue between the ends of the rods and as if spread in place subsequent to the completion of this hardest of animal tissues. They are broken or torn from the organic tissue which lies between the rods, separates them, or outlines and confines the matter of their composition, as one's histology privileges him to elect. This would make the edges of these little cup-like depressions continuous with and a part of the organic matrix of enamel,—and such is the fact.

Looked at, then, comprehensively, and necessarily perhaps for the object we have in view, the crown of a tooth may be likened to a membranous bag, the special conformation of which is due to and to a certain extent maintained by tubular threads of the same material running in the direction of or converging at a common center or axis, the tubes themselves being partitioned off at intervals, or their walls tied together with like material, and the spaces thus formed packed with inorganic matter or the salts characteristic of tooth-tissue. It is conceded on all sides, we take it, that every unworn, enamel-covered tooth possesses a membrane-like coat,—not necessarily "membrane" in a technical sense, but in the sense of animal tissue of extreme tenuity.

We now pass to another matter. Tie a bit of intestine, or section of drumhead, or other thin animal tissue, over the bottom of a glass tube,—a common lamp chimney, for example; nearly fill it with a solution of common salt, and immerse the whole in a dish filled to the same level with an equal quantity of fresh water. Immediately a change, an interchange, begins, and soon we have two portions of water, the first of which has lost much of its salt and saltiness, while the other has gained in salt in exact proportions; an equilibrium has been established; one portion is just as thoroughly impregnated with salt as the other. Again, place a weak solution of a given acid in this membrane-bottomed tube, and the whole in a dish containing in solution or suspension material more or less soluble in the acid in question. Here, too, an interchange of fluids takes place, chemical action ensues, and with these two processes, or this double process, we have in tube and dish respectively a quantity of fluid, each exactly like the other, so far as solvency and solubility are concerned, and the quantity of matter held in solution. In case the dissolved or suspended contents of the dish are soluble only in part in the acid in question, a precipitate will be found either in suspension or in bulk where formed. Yet, again, take a large, well-developed, unworn biscuspid; cut off about three-sixteenths of an inch of the root; drill a hole as large as possible the full length of the pulp-chamber. Now attach to the root end of the tooth one

end of a piece of rubber tubing, connecting the other end with a vessel containing a strong solution of salt or other material, the physical or chemical properties of which are easily determined; in another vessel (and the smaller the vessels that will answer the purpose the better) place a like quantity of pure water, and in it immerse the crown of the tooth under experiment, care being taken that the water in both vessels stands at the same level. We have an interchange similar to that just described.

In chemical physics the above detailed phenomenon is known as osmose, (impulse, to push), and is described as "the tendency in fluids to mix, or become equally diffused, when in contact. It was first observed between fluids of differing densities, and as taking place through a membrane or an intervening porous structure. The more rapid flow from the thinner to the thicker fluid was then called *endosmose*, and the opposite, slower current, *exosmose*. Both are, however, results of the same force. Osmose may be regarded as a form of molecular attraction allied to that of adhesion." Of course, as stated a moment since, Nasmyth's membrane is conceded. That it acts in its place on teeth as our bit of animal tissue does in the dialyzer may or may not be conceded; nevertheless, we assume that also to be the case. Bearing in mind, then, the fact that every unworn human tooth is covered with membrane having processes that dip into the enamel and separate, outline, and define its prisms; also, the further fact that this membrane is the seat of a kind of action which takes place between fluids that differ more or less in density or in chemical composition, we hasten to consider its value in making clear certain hitherto unexplained, or but partially and therefore unsatisfactorily explained, phenomena.

Every one has seen and had occasion to remove the so-called green stain, the "moss" of the gamin, from human teeth, in both the infant and the adult, the former particularly. This deposit of pigment is said to be on, or rather in, the enamel, and this is true within certain limits. It does affect the inorganic element of enamel, but to a much less extent than is the case with the organic part or matrix, and not at all where the pigment is small in quantity and the stain correspondingly slight in degree. That this is the case may be determined in two ways: First, make a vertical antero-posterior section of a faintly-stained incisor; finish one side perfectly, and cement that side with old balsam to a glass slide; when the balsam has become hard grind the opposite side, examining carefully from time to time, until the section has been reduced as nearly as possible to the thickness of an enamel-prism. It will now be found that the greatest deposit of pigment is next the surface; that it

grows fainter as we follow the dippings of the matrix into the enamel, and that it is faintest, or not to be detected at all, in the inorganic portion. Secondly, cement the well-finished central or dentine surface of a cross-section of green-stained enamel to a glass slide in the manner described, and grind, frequently examining it. Note carefully its appearance before grinding, and compare with the appearance of the section when but slightly ground. The result of the first application of the wheel will be the indistinct outlining of the rods, the centers appearing light. These light spots will continue to increase in size as the grinding proceeds, until the pigment is narrowed down to the matrix itself. Thus we see that this membrane and its processes in the form of matrix of enamel is the seat of the deposit of pigment, the favorite place, and that its appearance in the inorganic portion is merely incidental.

These facts point to an inflow of pigment-bearing fluid and demonstrate osmotic properties in the membranous layer of the crown of the tooth. Flow in one direction means necessarily some flow in the opposite direction. This pigment is carried from the surface through the membrane proper and into the matrix; and the fact that it is confined chiefly to the organic element of the tooth, and penetrates to a greater depth than in the inorganic portion, not only proves the peculiar fitness of the place of its deposition, but as well the interchange in membrane between the fluid that carries it and the fluids or juices of the tooth itself.

Another matter that calls for consideration is the peculiar outline described by teeth when wedged or packed in well-formed and otherwise well-developed arches, and particularly noticeable in first molars and second bicuspids. These teeth stand high in the scale of quality, being deep colored, of dense structure, almost invariably worn down, quite free from decay, but crowded to distortion. This crowding of the teeth is said to be from back to front, the center of the arch corresponding to the central incisors. In the cases in question, however, the crowding is from the third molar and the central incisor, the center of the arch, or sub-arch, being the second bicuspid of either half of either jaw. The compressed contour of these key-teeth, the mutual fitting in, is seen at a glance, even in some unworn teeth; but when such teeth have been reduced by wear to a common level their appearance at once excites remarks, and the question naturally suggests itself—How came they so? Had they this contour while still in the jaw and about to erupt? Was this their form before crowding of the arch began? Or is this condition subsequent to eruption and consequent upon crowding and mutual compression? Is such a thing possible? Knowledge is possible in matters of this kind only at the end of a series of obser-

vations and measurements, carefully noted, and such in the present instance are wholly wanting. A comparison cannot well be made between, for example, a bicuspid after twenty or thirty years of wear and the same tooth at the date of its eruption; but the time in which a comparison can be made is sufficiently long to verify the observation that teeth long used and much worn exhibit a quite different contour from that possessed by them five, ten, or more years earlier in their history. This verification, though partial, is found in observation of the facts that in young subjects it is but just noticed; that later in life it is quite marked; that while newly-erupted teeth may and in some cases do exhibit a contour approaching that of the crowded and worn teeth in question, the neat adaptation, the accurate fitting in of tooth and tooth, is wholly wanting.

But beyond this partially satisfactory state of affairs we have each tooth incased in a membranous envelope, a covering in which osmose may and does take place, added to which we have pressure, already alluded to incidentally. Now, tissue of whatever kind, when subjected to continuous pressure, undergoes morphological change. This change of form seems to be accompanied by loss of tissue; but such is not necessarily the case. It is not the case with teeth when subjected to pressure only. Again, the juices of a sound tooth, including those of the pulp, are alkaline, and it is while dissolved in these juices that the salts of tooth-tissue are conveyed to their place of final deposition. If the fluids of the mouth are less alkaline, the interchange through the organic portion—Nasmyth's membrane and its tubular processes—will result in the juices of the tooth losing somewhat of that already in solution and the taking up of some of the material already deposited. The same thing is true, but to a greater degree, of the oral secretions, if acid, the juices of the tooth being under the greater necessity of maintaining their alkalinity, which they cannot do without further inroads into material already stored. This interchange of fluids through a membrane subjected to pressure must effect change in form, and, while this change necessitates for the time being a loss of substance, there is not necessarily any decrease in bulk,—the tooth measures just as many fractions of an inch about the waist. It is just as stocky in its changed form, but is more loosely constructed and weighs less than before the change.

Thus we see, or think we do, the reason for change of form in the teeth of a crowded but otherwise well-built arch, such change resulting from the presence of intervening membrane, which is the seat of osmotic action and subject to continuous pressure; also from the rise and fall in the density or chemical composition of the oral secretions as opposed to the juices of the tooth.

A further consideration, but which is really an extension or exaggeration of the conditions just detailed, is that teeth are generally in contact, but so related the lower to the upper that little or no pressure is detected. Contact is not necessarily fatal to teeth, but when found in teeth of poor structure and bathed in acid secretions, a series of evil results may be looked for and almost invariably found. Pressure adds to the certainty of an early break-down in the tooth-tissue. The first thing observed in these cases is a faint stain in the enamel at the point of contact. Every one present has cut into a molar or bicuspid preparatory to approximal filling, flattering himself that that place offered but one cavity, when suddenly he is tempted to but just feel of a little stained spot on the adjoining tooth. His instrument goes through, punctures it, and he finds a good-sized cavity, loosely filled with broken-down tissue,—a cavity that must be cared for now. Here we have (or had until punctured) a cavity tissue-filled and mechanically closed to the fluids of the mouth,—not an opening, however minute, nor a crack, nor a fissure. If a comparatively thick vertical section be made in the plane of this spot and the pulp-chamber of such a tooth, that part corresponding to the periphery will be found hard, well-defined, and of sharp contour, while just beneath and spreading in all directions like a fan will be seen a territory of tissue light in color, soft, chalk-like. Further attempts to reduce the section will result in the complete washing-out of this opaque territory,—which by the way may not only involve the enamel but also the dentine. Now, what is the explanation of this thing? To begin with, we have Nasmyth's membrane, including the matrix of enamel; then we have that kind of activity known and described as osmotic; and, finally, an interchange of fluids by or through the membrane in question,—the fluids of the mouth, because of their lesser density, or more likely because of their acidity, dissolving and removing certain elements of the tooth and precipitating others more or less intermixed with the broken-down organic matrix of enamel.

Another observation, and we have done. What has just been said seems to settle not only the fact that we may have the equivalent in effect of decay in teeth without direct mechanical communication with the oral cavity, but it also settles the question of priority as between acids and micro-organisms. If cotton and cork serve as barriers to these minute bodies, Nasmyth's membrane must surely do as well while it remains intact. Micro-organisms may have much to do with the production of acids in the mouth, and certainly have with tooth-decay when an entrance has been effected to or through the enamel; but many of the phenomena commonly observed in the early history of tooth-destruction are the result of acids which such

organisms are incapable of producing. But, given softened enamel in conjunction with broken, cracked, perforated enamel cuticle, and the way for these agents is direct and their work destructive to the last degree.

Discussion.

Dr. Frank Abbott. One of the points in the paper that interested me particularly is that Nasmyth's membrane is continuous with and attached to the matrix of the enamel. That is quite an important point when we consider the subject of pigmentation of the enamel. This is a subject that has never been thoroughly studied by microscopists. I have written a little upon it myself, as some others have, but no one to my knowledge has gone into the subject sufficiently deep to talk upon it very learnedly. The impression I have is that the organic portion, or matrix, is the part that holds all the pigment or coloring matter in the enamel. The deep brown stain that we frequently see in enamel that is apparently as hard as when in its normal state is a matter of a great deal of interest as to what it is, how it gets there, and what contains it.

The organic portion of the enamal. notwithstanding the fact that it forms so small a part comparatively of the whole, seems to be able to hold sufficient coloring matter to be distinguished by the naked eye. That the inorganic portion contains any of this pigment is a question, although the writer of the paper intimated that in his opinion it does contain a certain portion. I hardly think the lime-salts of the enamel are capable of taking up and holding this coloring substance. But these observations convince us that there is a very fine and delicate reticulum in the enamel,—so fine and delicate that when you examine a section under the microscope you get the impression of an entire, unbroken color. The white specks spoken of in the paper are perceptible, but you have to use a very high power,—as high as 1000 or 1500. I think that particular question is one of very great interest in connection with caries of the teeth; and the question of how this certain kind of caries that is spoken of in the paper is brought about; is one that has never been fairly settled by any one in the profession that I am aware of. Take a tooth the surface of which seems to be as hard and perfect as any, press the point of your instrument upon it firmly, and it goes through a thin shell of enamel and finds only a chalky substance, confined almost exclusively to the enamel, which is the broken-down or disorganized material of the enamel. This indicates that the reticular structure of the enamel has been destroyed, or perhaps never existed, if the condition is congenital, leaving only a mass principally of phosphate of lime, without any organization whatever. The questions here presenting are, What has become of the matrix, if it ever

existed as such? If it never existed, how has the building up of the enamel been accomplished? Here is a large field for some one to labor in, which promises well for the laborer. That Nasmyth's membrane is, when examined under the microscope, found to be epithelial in structure, I am as sure as I am of anything I see; that it is a part of and connected with the organic portion of the enamel I have not a doubt. I have not any doubt that it is composed of the same material that the matrix of the enamel is composed of; that it is a glue-giving substance,—a substance which, if it could be obtained in any quantity, would be found to be the same as that in the reticulum of dentine, the reticulum of cement, or of bone.

Dr. E. A. Bogue. Dr. Abbott, as I understand him, assumes that there is no colloid structure in the teeth under the circumstances named,—no gluey or animal substance.

Dr. Abbott. Yes.

Dr. Bogue. You asked what became of it.

Dr. Abbott. I take it for granted from appearances that there is none; that it has disappeared or never has existed.

Dr. Bogue. What proof have you that it has disappeared?

Dr. Abbott. The color and extreme softness of the tooth at these points under the thin scale of enamel.

Dr. Bogue. It is disintegrated chemically, I suppose.

Dr. Abbott. Perhaps. There is a disorganized condition of that portion of the tooth,—an absence of the matrix of the enamel.

Dr. Bogue. And must be gone?

Dr. Abbott. Yes.

Dr. Bogue. Has it been examined to prove that?

Dr. Abbott. Not that I am aware of.

Dr. Dwinelle. Would you consider it a progressive deterioration?

Dr. Abbott. In many cases it is; not always, however.

Dr. Dwinelle. It was once organized, and it has lost its organization.

President Jarvie. Dr. Abbott says the tooth has lost its organic substance. I wish to ask him if it ever had it.

Dr. Abbott. In most instances I do not believe it had. I believe that such teeth have come into the mouth without an organic framework of the enamel in the places referred to. I do not believe there has ever been a perfect reticulum in those places. I may be mistaken, of course. I give this as an opinion, without having carefully studied the subject.

Dr. Dwinelle. They are in other instances perfect. Is not that a mark that it is progressive? Some of these spots are covered with a thin crust of hard enamel, and when you perforate that thin crust you come into a dust heap.

Dr. John B. Rich. I have no doubt that it is progressive, from the fact that part of it is soft and part of it is hard. I think this is a very interesting subject for investigation. We have always been absolutely in the dark in regard to the processes of decay; and may not this very fact that is mentioned in the paper, the transmission of fluids through the tooth-structure, be an explanation of the real source of decay? I have no doubt that in the cases Dr. Abbott speaks of the organic part of the structure has been dissolved out. There is a certain well-marked line where it remains; it is there hard. But I doubt very much that in a normally constructed tooth there is ever that condition in which the organic matrix is not perfect in all parts of the tooth. This is an investigation that will be likely to lead to a solution of that question which has engaged the attention of every person in our profession, and the attention of histologists who have directed their investigations to the dental apparatus,—that is, what is the cause of decay in teeth? It is yet a mystery; but this paper seems to be almost a solution of the question. I, for one, am very much obliged to the author of the paper for the contribution he has made.

Dr. Dwinelle. This is a very interesting subject for discussion, and I have no doubt this paper will lead to great good. The matter of the progressive degeneration of the dentine of the teeth, as well as of the enamel, is a very important one, and it seems as though it was occupying the attention of our profession more at this time than ever before. I have seen more of it recently than in my whole previous professional life. Unfortunately, I have had a good deal of it to deal with to-day and yesterday. We do know that with a great many of our patients, especially young men, young women, and girls, who exhaust their nervous systems by over-study and under-feeding, and who suffer from impure air, malaria, and want of proper exercise, the teeth undergo manifest changes in a short time. I had a lady in my chair to-day, and her sister yesterday, both of whose teeth have within a year degenerated wonderfully and deplorably. I have kept a sharp watch of them, and I know that both the enamel and the dentine of their teeth have degenerated to an alarming extent,—more within a year than we often see occurring in a period of many years. In the case I had to-day the destruction or degeneration of the dentine and the enamel was so great, and the tooth-substance had become so thoroughly disorganized, that it was like an impalpable powder of carbonate or phosphate of lime. After cutting down as far as I dared to in my search for perfectly solid dentine,—and in one instance, I am sorry to say, I exposed the pulp,—I finally touched bottom; yet, in washing and drying out the cavity and going over the surface anew, to make assurance doubly sure, the

product of my scraping and burring struck me as being in color remarkable. It was as white as the driven snow; even where I had burred it off from apparently normal dentine, it was of that peculiar white color, showing the degeneracy of the dentine,—the devil there still, so to speak. In these instances I was obliged to remove gold fillings that I had put in these same places within a year. The gold fillings came out intact, with the impressions of all the irregularities of the original cavities as perfect as possible, as shown under the magnifying glass. Though originally perfect and surrounded by solid walls, they now seemed vibrating loosely in a bed of carbonate of lime. I am losing confidence in gold under these circumstances. I filled a portion of these teeth yesterday and to-day with tin. I found a valuable hint in the fact that I had successfully filled some of the same kind of cavities for a sister of the patient's with tin more than a year ago; and yesterday I filled some of the cavities with,—pardon me, gentleman, for making the confession,—I filled them with amalgam. I believe that there is a certain quality in tin and in amalgam which, under some peculiar circumstances, makes them superior to gold as a stopping for teeth. More than thirty-five years ago, when I had occasion to say a good word for amalgam, I referred to an oxidation which was thrown off from it—in those days it was a very black oxide—that so embalmed or fossilized the soft decay left in the tooth that it became so hard and flint-like in its texture that an instrument in passing over it gave off a distinct crepitous sound, as though it were in contact with stone, glass, or hardened steel. In this result something might be attributed, too, to the process of recalcification, which, under the apparent stimulus of an amalgam filling, sometimes seems to proceed with great rapidity. In consequence of the peculiar qualities of amalgam, I have sometimes been enabled to save teeth with it where I had failed to do so with gold. It is well known that some of our modern amalgams or alloys are so skillfully compounded that they do not stain the teeth filled with them even in the slightest degree. However, I did not intend to revert to the subject in this manner. I congratulate the members of this society that this subject has been brought before us to-night. As far as my practice is concerned, I am in a frightful epidemic, so to speak, of cases like those referred to.

Dr. Atkinson. This is a paper that deserves more than a light discussion, or a mere running over and jumping at conclusions from mass observations which we are all able to make by the natural power of vision. But those who have studied histology and have followed the paper clearly will see that it is worthy of being taken up section by section and studied, to see how much of it we understand, how much of it we agree with, and how much we would set

aside. As a wise man once said, I will also show mine opinion. I have lived long enough not to over-estimate mere opinions. We are after knowledge. There are some statements made in the paper that I would like to controvert, and there are many more that I would like to support with my best energy. When we talk about different things, thinking we are talking about the same thing, we will always be led in opposite directions, and flatter ourselves that we are making out a case against a proposition when we do not understand it. The doctor's conclusion with regard to the chemical activity that invites the pigment or coloring matter into the tooth-substance seems to me to be simply an assumption. When we know more about the building and the unbuilding of a tooth we can speak more intelligently upon this question. He said that when a tooth in this condition was cut through the side of the pulp next to the diseased part showed a deposit of a fan-like appearance, running thinner and thinner out to the line of disintegration where there was no structure. Dr. Abbott said the animal substance had been taken away. I would rather suppose that the animal and mineral substances had been disintegrated and dissolved, but remained there; which must be so if Nasmyth's membrane be intact. But when teeth are cut down so that one-third of the body of the crown has been worn away, what has become of Nasmyth's membrane? All the Rodentia show us that condition. The rat, the beaver, the woodchuck, and all those creatures, have a stain on what was called the enamel, but which proves to be cement. When we have artificially stained enamel it is different; the enamel is more difficult to stain than the dentine, but we find that the enamel is stained, not only in its fibrils, but apparently in its basis-substance also. The white spots spoken of are indications of the more solid lime-salts where the staining matter had not penetrated when the enamel-rods were cut through. We do not know anything about these intimate molecular changes, which constitute the construction and the destruction of tooth-substance, further than that it is a consolidation of lime-salts in an animal matrix. We cannot determine whether these changes are normal or abnormal, chemical or organic and nutritional, and hence we are in great difficulty. Every nutritional activity has a chemical phase or condition, under the law of chemical equivalents. The strongest and newest point in the paper is that in regard to endosmose action through Nasmyth's membrane. What is that? It is the difference in saline strength of two fluids, and the tendency they have to become balanced. This is the whole of the point that is made. Abstractly the chemistry of such endosmose action may be correct, but I have grave doubts whether it has any bearing upon the question of caries as being causal of or even

immediately antecedent to decay. Some one said we do not know what decay is. In the sense of an entity we do not know what it is, but we know it means the unbuilding and undoing of the work of the organism that has built up these little organs that we call teeth. Let us wait until this paper is published. and then take it up for discussion. The author of it has an honest way of putting things, and when he gives us his ideas we have a guarantee that he means what he says, and that what he says is worthy of our reception. Our trouble is that we spend too much time upon outside issues, instead of going directly to the pith of the questions that are brought up in such papers as we have had to-night.

Dr. Line. My conclusions on this subject are scattered through the body of the paper, not having had time to formulate them for addition at the close. Dr. Atkinson and Dr. Abbott have spoken of one point that I thought I had made clear. Dr. Abbott referred to the breaking down of the tooth-tissue behind the organic matrix or sheath that envelopes the tooth. That is so; and my version of the process is this: The fluids of the mouth are differently alkaline in comparison with the juices supplied by the pulp; the fluids of the mouth are acid while the juices of the tooth are alkaline. This acid acts upon the lime-salts, and disintegration takes place of both the carbonate and the phosphates, and with that disintegration the matrix must lose more or less of its support; but until the investing membrane is broken the disintegrated substance cannot escape in bulk. It does escape to some extent in the form of a solution, and also in the form of precipitate, which is washed out as soon as Nasmyth's membrane is punctured.

Adjourned.

E. T. Payne, D.D.S., *Secretary.*

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The National Association of Dental Examiners held its fourth session in Curtiss Hall, Minneapolis, Minn., commencing Tuesday, August 4, 1885. President J. Taft in the chair.

The following State boards were represented, the four last named being new members: Ohio, by J. Taft and H. A. Smith; Illinois, by Geo. H. Cushing, A. W. Harlan, and C. A. Kitchen; Pennsylvania, by E. T. Darby; Maryland, by T. S. Waters; Michigan, by G. R. Thomas and A. T. Metcalf; Louisiana, by Joseph Bauer; Indiana, by S. B. Brown; Iowa, by W. P. Dickinson, J. T. Abbott, J. Hardman, J. F. Sanborn, and E. E. Hughes; Dakota, by S. J. Hill; Kansas, by L. C. Wasson and Wm. Shirley; Wisconsin, by Edgar Palmer, C. C.

Chittenden, B. G. Marcklein, E. C. French, and J. S. Reynolds; Minnesota, by S. T. Clements and G. V. I. Brown.

The following boards belonging to the association were not represented: Vermont, New Jersey, Georgia, West Virginia, Mississippi, South Carolina, and Kentucky.

The following resolutions were adopted:

Resolved, That this association most earnestly commends the action of the Wisconsin and other State Boards of Dental Examiners, in refusing to accept the diplomas of the so-called Wisconsin Dental College, located at Delavan, on the ground that it is not a reputable school, and recommends to all State boards to which the diplomas of that institution shall be offered that they likewise refuse them.

Resolved, As the sense of this association, that persons engaged in the study of dentistry and physicians practicing as such should not be considered eligible to registration as dentists.

Resolved, That this association recommends that all applicants holding diplomas from the Royal College of Dental Surgeons of Ontario be required to submit to examination before they are granted license to practice.

Whereas, The dental law of the State of Maryland seems to be restrictive in its character; it is the sense of this body that the dental profession of said State of Maryland should, at the next session of its Legislature, seek to cause said dental law to be so amended as to be in harmony with the dental laws of the other States.

Resolved, That the secretary be instructed to forward a copy of the above resolution to the State Board of Dental Examiners of Maryland.

Resolved, That this association recommend all State boards not to grant temporary licenses to first-course students, or any others, unless fully satisfied that such applicants have had at least two years of practical clinical instruction. Such applicants shall pass as well a proper theoretical examination.

The following officers were then elected for the ensuing year: J. Taft, president; T. S. Waters, vice-president; George H. Cushing, secretary and treasurer.

Adjourned to meet at the place to be selected for the next meeting of the American Dental Association, on the Monday preceding the meeting of that body.

WISCONSIN STATE DENTAL SOCIETY.

The Wisconsin State Dental Society held its fifteenth annual meeting in La Crosse, Wis., commencing Tuesday, July 28, 1885, the sessions continuing for three days.

The following were elected officers for the ensuing year: James S. Perkins, president; R. W. Hurd, first vice-president; J. B. Williams, second vice-president; Claude A. Southwell, secretary; B. Douglas, treasurer.

Milwaukee was selected as the next place of meeting.

Claude A. Southwell, *Secretary*,
Milwaukee, Wis.

PENNSYLVANIA STATE DENTAL SOCIETY.

The seventeenth annual meeting of the Pennsylvania State Dental Society was held at Cresson Springs, Pa., commencing Tuesday, July 28, 1885, the sessions continuing for three days.

The following officers were elected for the ensuing year: J. W. Rhone, president; Louis Jack, first vice president; J. P. Thompson, second vice-president; Edw. P. Kremer, recording secretary; W. B. Miller, assistant recording secretary; W. H. Fundenburg, corresponding secretary; J. C. M. Hamilton, treasurer; C. S. Beck, Gale French, W. H. Trueman, Alonzo Boice, and C. J. Essig, board of censors.

The next meeting will be held at Cresson Springs, commencing the last Tuesday in July, 1886.

EDW. P. KREMER, *Rec. Secretary*, Lebanon, Pa.

MINNESOTA DENTAL SOCIETY.

The Minnesota Dental Society held its second annual meeting in Curtiss Hall, Minneapolis, Minn., commencing Friday, July 31, 1885, the sessions continuing for three days.

The following officers were elected for the ensuing year: F. A. Williamson, president; C. M. Bailey, vice-president; M. G. Jenison, recording secretary; C. H. Goodrich, corresponding secretary; H. M. Reid, treasurer.

The next annual meeting will be held in St. Paul, commencing the third Wednesday in July, 1886.

M. G. JENISON, *Rec. Secretary*,
301 Nicollet avenue, Minneapolis, Minn.

BIBLIOGRAPHICAL.

PRAKTISCHE DARSTELLUNG DER ZAHNERSATZKUNDE. Von PHILIP DETZNER, prakt. zahnarzt in Speier. 237 Illustrations. Verlag von C. Ash & Sons, Berlin, 1885.

This work of 305 pages is intended to be a practical illustration of mechanical dentistry in its various branches. The author dedicates it to the New Royal Dental Institute, of Berlin. The headings of the chapters will give a tolerably clear idea of the scope of the work, viz:

1. The preparation of the mouth for the insertion of artificial teeth. 2. The taking of impressions. 3. The preparation of plaster

and articulating models. 4. Artificial teeth ; the component parts and preparation of the same. 5. Pivot teeth. 6. The manufacture of sets on rubber base. 7. The manufacture of sets on gold base. 8. The manufacture of sets on platina base. 9. The manufacture of sets on celluloid base. 10. The manufacture of sets on continuous-gum base. 11. The manufacture of sets on aluminium base. 12. The manufacture of sets on cheoplastic base. 13. Preparation of obturators.

It is evidence of progress to read, in the chapter devoted to the preparation of the mouth. that a set which is fitted in part or whole over roots can never give satisfactory results. Such advice has been sadly needed in Germany, as probably the largest proportion of teeth have been inserted in this way.

The author devotes more space than seems necessary to instruments for excising crowns,—all the more as their use is of doubtful propriety.

A rather odd beginning for a work on mechanical dentistry is the part devoted to the description of nerve instruments, but he brings them into use further on in the insertion of pivot teeth.

Considerable space is devoted to the materials for and the taking of impressions. The directions are generally very good, and in accord with general practice, as is also the preparation and antagonizing of models.

The chapter on pivot teeth is not fully up to the subject as it is understood here, yet upon the whole it is concisely and clearly treated. He gives a limited space to the Bonwill crown, and none at all to some others of perhaps equal value. This branch of the dental art has grown to such proportions in the past few years that it has almost become a specialty in itself, and should have been allotted more space and fuller illustration.

The chapter on rubber base precedes that on gold, for the reason, given by the author, that rubber has entirely thrown the latter into the background. As a result of this opinion, gold is given not only less space, but is greatly lacking in detail. It is a mistake very commonly made, and by no means peculiar to our author, to suppose that the modern dentist has but little use for gold work. That this is not true is daily becoming more and more evident in the practice of the best operators. What is really needed is a return to the exact knowledge and skilled workmanship of thirty years ago.

The fact that he can devote five pages in description of the spiral spring attachment to sets, carries conviction that German mechanical dentistry has yet something to learn. These have not been inserted here to any extent in the past thirty years, the use of atmospheric plates having rendered them obsolete. The bad prac-

tice before mentioned, of leaving roots in the mouth, has rendered spiral springs a necessity; hence all the appliances for the work are kept in stock by dealers, and are in constant use by dentists.

The work closes with a chapter on obturators, reasonably full in description, and in which justice is done to Süersen, Schiltsky, and Kingsley, theirs being the three most satisfactory forms at present in use.

The book is carefully prepared and satisfactorily illustrated, but is better adapted for the experienced dentist than as an aid in the instruction of beginners. The average writers of books forget that they should write as teachers must teach, if they wish to make them valuable to the inexperienced. The best text-books are those full in detail and clear in explanation. Some change in this respect in future editions will make this work more valuable, both to the practical dentist and the student in his laboratory.—J. T.

Books and Pamphlets Received.

Second Report of the State Board of Health of the State of Tennessee. October, 1880--December, 1884. Published by authority. Octavo, cloth, 600 pp. Nashville: Albert B. Tavel, printer to the State, 1885.

Circulars of Information of the Bureau of Education. No. 2, 1885: "Teachers' Institutes." Washington: Government Printing Office, 1885.

On Herbst's Method of Gold Filling by Rotating Burnishers, by Storer Bennett, F.R.C.S. and L.D.S. Eng., L.R.C.P. Lond. Reprinted from Transactions of the Odontological Society of Great Britain, January, 1885. London: Harrison & Sons, 1885.

Address, delivered before the American Academy of Dental Science, at their seventeenth annual meeting, held in Boston, November 5, 1884. By Edward N. Harris, D.D.S., of Boston. Boston: Thomas Todd, 1885.

Shadows in the Ethics of the International Medical Congress, by Levi Cooper Lane, A.M., M.D., professor of surgery in Cooper Medical College, etc. San Francisco: A. L. Bancroft & Co., 1885.

GENERAL ULYSSES S. GRANT.

Died, at Mount McGregor, N. Y., July 23, 1885, Ulysses Simpson Grant, General United States Army (retired list), and ex-President of the United States.

OBITUARY.

ISAIAH FORBES, D.D.S.

DIED, in St. Louis, Mo., July 15, 1885, of general debility, ISAIAH FORBES, D.D.S., in the seventy-sixth year of his age.

Dr. Forbes was for many years a prominent member of the dental profession in St. Louis, and was one of the founders of their local society. He was elected vice-president of the American Dental Association in 1873, and was well known throughout the profession. At a meeting of the St. Louis Dental Society, July 16, a committee composed of Dr. C. W. Spalding, W. H. Eames, and Geo. A. Bowman, was appointed to prepare and reported resolutions, which were adopted, giving formal testimony to the high regard in which Dr. Forbes had ever been held by the society, and expressing the conviction that the profession of dentistry had lost a worthy and valuable member,—one who deserved and received the confidence and respect of his fellow-practitioners, and who was an ornament to the profession to which he belonged. It was ordered that the resolutions be spread upon the records of the society, and that a copy be sent to the family of the deceased. The American Dental Association, at its late meeting at Minneapolis, Minn., also passed appropriate resolutions of respect to the memory of Dr. Forbes.

PERISCOPE.

THE HUTCHINSONIAN TEETH.—The test-teeth of inherited syphilis are the two permanent central incisors in the upper jaw. They are known as the Hutchinsonian teeth, after the distinguished Englishman who first accurately described them.* The broad, rather shallow groove in the cutting-surface is the feature which distinguishes them. These teeth are often convergent or divergent, but may be straight, and they are often narrowed on the cutting-edge, but not necessarily so.

FIG. 1.

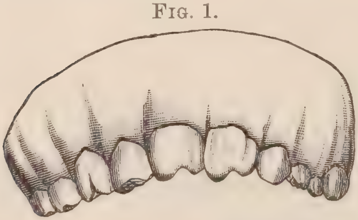
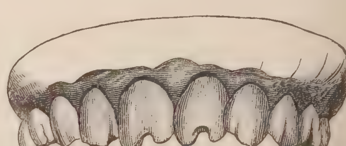


FIG 2.



I have here two casts of the upper set of teeth, showing the characters usually believed to indicate inherited syphilitic disease (Figs. 1 and 2). I present with them Hutchinson's original plate, and a

* Illustrations of Clinical Surgery, London, 1876. Fascicules III, Plate XI.

photograph of the woman whose teeth are pictured in Fig. 2, showing the macular syphilide which was upon her when I first saw her. The patient whose teeth are represented in Fig. 1 had inherited syphilis. The patient possessing the teeth represented in Fig. 2 showed no sign of ever having had inherited disease, and came to me with fully-marked secondary syphilis, which she had acquired from her husband. I think the case is interesting, as illustrating the fact that teeth very closely, if not identically, resembling the test-teeth of Hutchinson may be possessed by a patient who has not inherited the disease. The cases are briefly as follows:

Case VII.—To this case belong the teeth of Fig. 1. One of the outer incisors was crowded out of line by the contraction of the jaw, and appeared behind the alveolar border. It is not represented in the cast, which was taken by the husband of the patient, a plasterer by trade.

In 1878 I first saw this patient, 14 years old, with a large gumma in the right axilla, then ten years old. Her mother who brought her had an old syphilitic ulcer on the leg, at the bottom of which was a necrosed portion of the tibia. The child had also a large node on the left tibia. She had strabismus and bad headache, with some scabs in the scalp. When five weeks old an eruption came out over the entire body, nose, and the feet, and she has suffered from mottled, livid, scaling spots and rheumatic pains ever since. Her treatment had been more or less constant since birth. The child was plainly a victim of inherited disease. The mother was frankly syphilitic, and had miscarried once and produced two dead children before the birth of this child. The father was also syphilitic (ulcers and nodes).

This patient had a variety of disorders, among which was sudden blindness for half an hour at a time; but she recovered of everything, even her strabismus, under treatment; married at the age of 17; produced a healthy child; then took to drink; developed a well-marked tubercular syphilide on the arms, with ulcers on the scalp; miscarried five times in succession, and finally died.

Case VIII.—To this case belong the teeth of Fig. 2. Mrs. X., aged 31, visited me in February, 1884, showing flat, mottled patches of a recent papulo-erythematous syphilide, covering the trunk and extremities, with a few spots on the face. She related that her husband had a sore upon his penis, and had given her a similar ulcer upon the vulva some weeks previously. The sore was well at the date of her visit to me. She showed also mucous patches in the mouth, indurated glands, fall of hair, etc., and the teeth as seen in the cast.

Her father and mother are alive and well, she says. She herself has always been healthy. She has no scars, no syphilitic countenance, no history, and no evidence of any inherited disease. She is robust and well-formed; has had five healthy children, and laughs at the idea of having suffered from any inherited malady. Actually she has recent syphilis.

In March, 1885, one year later, she returned—still under treatment at the hands of her own physician—and presenting well-marked clusters of tuberculo-squamous syphilide in patches upon various parts of the body. The photograph shows the appearance of the first eruption on the chest.—*E. L. Keyes, M.D., Medical News.*

Chronic Suppuration in the Antrum.—During 1884 three cases of antral suppuration came under my care. They were treated somewhat differently from the method described in most text-books, and with so good a result that I think an account of the cases might be of interest. They are, in most surgeons' hands, admittedly difficult to cure, and treatment generally extends over a considerable period.

The usual treatment is to open the antral cavity freely, if possible, through the alveolus of the bicuspids or molars, and teach the patient to wash out the cavity by the forcible contraction of the buccinators and orbicularis oris on a dilute disinfectant held in the mouth. I have treated many cases in this way, but always with very unsatisfactory results. I resolved, therefore, to be a little more heroic in my treatment, and instead of the dilute disinfectant, to use a powerful one. Having removed all offending teeth, with none of which the disease appeared to be connected, the cavity was freely opened through the socket of one of the teeth, and freely syringed with a ten per cent. solution of carbolic acid. The cavity was plugged with lint soaked in a twenty-five per cent. solution of carbolic acid. This was allowed to remain twenty-four hours, the opening into the mouth being closed by a plate in two cases, and by a plug of cotton-wool soaked in gum-mastic in spirit in the third. This was renewed for several days after syringing the cavity with a ten per cent. solution of carbolic acid, until all fetor (which was of the characteristic kind found in these cases) had disappeared.

From that time for about a month the cavity was syringed every other day with a ten per cent. solution of carbolic acid, but there was no return of the fetor. The pus, in the first instance, was full of bacteria, and had for months, in each case, been a source of great discomfort and anxiety to the patients. They looked anemic, and were losing flesh. All appetite had gone, and they were afraid to go into society. Each case had to be treated with slight differences, but the above treatment is sufficiently accurate to apply to all. I append some notes of one of the cases.

The patient was Miss M., aged 40. Her history was good. There was no splenic taint. She was very anemic, and much thinner than previously; had no appetite, and was always feeling sick; she had a disgusting taste in her mouth at all times, and occasionally a discharge from the nostril. There was a collection of fetid discharge at the back of the throat every morning. She had noticed it for quite six months, and had been treated medically, but with no good result. The breath was very offensive. There was no eczema. The face had been slightly swollen several times, just under the eye. There was very little pain, except when the swelling was coming. I removed several roots of teeth, and opened the cavity through the second bicuspid socket, making the opening as large as possible. A large quantity of very fetid pus was discharged. I syringed the cavity freely with a ten per cent. solution of carbolic acid, and plugged it with lint soaked in a twenty-five per cent. solution of the same. On April 7 I removed the plug, syringed, and applied a fresh plug. There was very little pus, but still fetor. On April 8 there was slight improvement. The treatment was continued. On April 12 she was much better; no fetor. The plug was removed perma-

nently. The cavity was syringed with a ten per cent. solution of carbolic acid. The syringing was continued every other day for a month. By May 20 it had healed; there was no discharge, and the patient looked and felt better. On February 6, 1885, I saw Miss M.; she was then quite well.—*Dr. Morton Smale, in British Medical Journal.*

Pathogenesis of Rachitis.—Dr. M. Kassowitz is publishing a valuable systematic paper on "Normal Ossification, and the Diseases of the Bony System in Rachitis and Hereditary Syphilis," of which the second division of the second part, on the "Pathogenesis of Rachitis," appears in the last issue of the *Medizinische Jahrbucher* (1884, Heft IV). The results of clinical observation and experiment upon animals are quoted in support of the view of the local origin of the disease. With regard to the view that the deficient resorption of the lime-salts is due simply to the fact that it is hindered by diseases of the digestive apparatus, dyspepsia, and catarrh of the stomach or intestinal tract, he calls attention to the following facts:

1. That rachitis extremely frequently is developed *intra uterum*, where neither digestive disorders nor insufficient resorption of the lime-salts brought to the fetus in the maternal fluids can be assigned.
2. That rachitis, as is shown by experience and the testimony of numerous observers, very commonly shows itself in children possessed of normal digestion and who enjoy a good bodily condition of nutrition.
3. That in the summer months, just when disorders of the digestive apparatus prevail in children, the number and intensity of cases of rachitis diminish gradually and in a most striking manner.
4. That, finally, other conditions, which are in no wise connected with the digestion and resorption of lime-salts, such as bad hygiene of dwellings, syphilis, etc., favor the development of rachitis in a most remarkable degree.

After considering other theories of pathogenesis, the article concludes with the following propositions:

1. That the deficiency of lime of rachitic bones is called forth, singly and alone, by the local inflammatory process.
2. But the local process in the bones in turn has its origin in some preceding anomalous conditions of the entire organism.—*Phila. Med. Times.*

The Influence of Sex on the Frequency of Dental Caries.—Dr. V. Galippe considers that, generally speaking, the density of the teeth in women is less than in men. It has long been recognized that pregnancy diminishes the density of the teeth, but Galippe considers that this aptitude for dental caries frequently coincides with puberty, and is accentuated by each succeeding pregnancy. The cause of this he attributes, in common with Landouzy, to the lowered degree of alkalinity of the fluids of the body. In this connection it is interesting to note the frequency of biliary lithiasis and of mitral stenosis, which seem to be closely connected with the genital life of the female.

This diminished amount of alkalinity in the female seems to have two factors, the one dynamic or functional, the other organic or ana-

tomical. From the dynamic or functional point of view, the nutrition of the woman is retarded; from the anatomical or organic point of view, the blood of man contains more corpuscles than the blood of woman; therefore, the fluids of the body in man are more alkaline than in woman. To satisfy himself on these points, and as having a direct bearing upon the teeth, Dr. Galippe made a large series of observations in hospitals upon the reactions of the saliva in pregnant and newly-delivered women, and in nurses as well. The result was that the saliva was found to be acid in a majority of the cases. Another set of observations was between men and women in comparable conditions, where the saliva was less frequently alkaline in women than in men, and where it was frequently acid. When the alkalinity existed, it was often so feeble as to be totally inadequate for the saturation of the acids which form in the mouth. The elimination of carbonic acid is greater in man than in woman; it is nearly double at the period of puberty.

Dr. Galippe in one case observed the saliva become acid during the menstruation, and accompanied by malaise. Besides these local phenomena, during menstruation the impulse of the heart is stronger, respiration is accelerated, and the amount of urea diminished. It is not to the frequent acidity of the saliva alone that this predisposition to dental caries is due. As has already been said, generally speaking the teeth of women have a density that is inferior to those of men; that is to say, they contain less mineral matter, and therefore the co-efficient of density is inferior. Now, if we take the woman at the period of parturition, we see how prejudicial this inferiority becomes.

The pregnant woman who does not receive, by means of a special alimentation, the elements necessary for the formation of the different tissues which constitute the fetus, and particularly the osseous system, may sustain her first labor; but if these pregnancies be repeated without special care and alimentation, by drawing upon her own economy—her pericliteral economy—we see a series of disturbances occur, of which dental caries is the most marked.—*Gazette des Hôpitaux.*

Remarkable Re-implantation of a Tooth.—Dr. Bestion relates (*Gazette des Hôpitaux*, January 17) a case which is probably unique as regards the length of time in which a tooth remained without replacement after being forced out of its socket. A sailor while engaged in securing a vessel placed the rope in his mouth in order to have a hand free. A comrade inadvertently tightening this rope forced out upon the deck the lower left median incisor. After some searching the tooth was found, but it was not until seventeen hours after the accident that the sailor related his adventure to Dr. Bestion, producing his tooth in a state of absolute dryness. After soaking it in water for a few minutes and then drying it, Dr. Bestion replaced it, the operation causing pain and some hemorrhage. The tooth keeping in pretty straight, no bandage was applied, the only precaution taken being to substitute for the biscuit soft bread, which for the early days was moistened with water or wine. At the date of the report—that is to say, three months after its replacement—the tooth was found to be quite solidly in place, the only change observable being a diminution of the brilliancy of the surface.

Dr. Bestion cannot find any case on record in which a tooth had been successfully replaced after a later period than four hours had elapsed. This is related by Magitot as occurring in a child ten years of age. This author also relates several examples of this time having elapsed in his operations in which the tooth has been intentionally drawn and replaced after the diseased parts had been excised. He also relates the case of a laborious removal of a wisdom tooth, that necessitated the preliminary extraction of the second molar, which was re-implanted about four hours after the operation.—*Med. Times and Gazette.*

The Relations between the Teeth and the Uterus.—Dr. S. W. Caldwell, of Trenton, Tenn., publishes the following peculiar case in the *Mississippi Valley Medical Monthly*, January 10, 1885:

Recently, while spending the night in the sick-room, I had as company a married daughter of my patient, an intelligent lady aged about thirty-two years, who related the following—to me—most singular phenomenon. Said she: "I am the mother of five living children, one dead. My terms of gestation are unmarked by anything unusual. My labors last about eight hours on an average. My last came on as usual with me—pain beginning in the back, passing down to the lower part of my bowels. When I had been in labor about an hour, the pain suddenly ceased in my back and womb, but set up in a tooth that had been aching several times during the past nine months. The pain was paroxysmal, coming and going just as it did in the womb. The pain was in my tooth when my physician came, and he wanted to extract it, but it being one of but few remaining molars, I said to him that the cavity in it was small, and that I wanted to have it filled—couldn't he put something in it and stop the aching? He put cotton saturated with chloroform into the cavity. The pain left the tooth to appear in the back and womb; but the effect soon passed off; the pain in a few minutes returned to the tooth, to be again and again relieved by the chloroform. The doctor said no progress was being made in the labor, and that in his opinion none would be until that tooth was removed." "Did he say he had ever seen or heard of such a case before?" "No, sir. Twelve hours had now passed; none of my former labors had gone over eight—generally six hours terminated them. I had become, I thought, exhausted, and asked the doctor to extract my tooth, which he did, and my baby was born in an hour."

The attending physician in the above case, with whom I was personally well acquainted, died not long after, so that I cannot have his history of it. My knowledge of the lady, though, justifies me in giving full credence to her statement.—*Medical and Surgical Reporter.*

Dental Alterations in Morphia-Maniacs.—M. Combes calls attention to the teeth of those unfortunates who abuse the use of morphine. When they become saturated with the drug it attacks, first, the molars on their grinding surfaces, where it makes a deep cavity. It goes next to the bicuspids, then to the cuspids, and in these last it excavates quite a deep cavity. This decay does not seem to be painful, and it is not accompanied with periostitis, but it proceeds with great rapidity. M. Combes has noticed the entire set

of teeth affected in a year after he saw the first one decayed. This destruction of the teeth coincides with the loss of the hair. The advice given is to suppress the dose of morphine little by little, and use hydrotherapia. For the local state a wash is recommended of a solution of iodide of potassium.—*Phil. Med. Times.*

Chloroform and Water as a Hemostatic Agent.—Dr. Spark recommends highly as a hemostatic agent chloroform and water in the following proportions: Chloroform 2 parts, water 100 parts. He claims that it acts with a rapidity that is truly marvelous; it has not the slightest disagreeable taste; it has no escharotic action; it is always at hand and made instantly; its cost is very slight; and there is nothing disagreeable in its application to interfere with the surgeon. In all operations upon the mouth and throat he uses this alone as a hemostatic. Recently in removing a sequestrum from the inferior maxilla, which was of the size of a large chestnut, by its use no blood was lost in what is usually a very bloody operation. A simple washing arrested all tendency to hemorrhage. In tonsilotomy, simply gargling the part or using the atomized spray is sufficient to prevent the loss of blood.—*Jour. de Médecine.*

A New Hemostatic.—At a recent meeting of the Academy of Médicine, at Paris, Professor Bonafoux read a paper upon a powder which possesses great hemostatic powers, and is capable, it is said, of arresting the bleeding of large arteries, so that it will prove serviceable in important surgical operations. This powder is composed of equal parts of colophony, carbon, and gum-arabic. Experiments have been tried with it on the brachial artery in man and on the smaller vessels, on the carotid of the horse and other blood vessels of the same animal, with marked success. It has always prevented consecutive hemorrhage. The application can be lifted in the course of two or three days, when the vessels are found to be completely obliterated.

Practice of Dentistry in France.—Notwithstanding the severe laws to prevent the practice of the medical art in France, the dentists have no regulation, and any one who likes can set up as dentist. There are practically no restrictions to their giving nitrous oxide, and, indeed, chloroform. This is partly owing to there being no official school of dentistry in France. Since American dentists have come so much abroad they have helped to start no less than two independent schools of dentistry in Paris, that are well attended, but have no legal existence. Prof. Brouardel, who is president of the Commission of Hygiene, tells us that there is a prospect of a bill being passed to regulate the practice of dentistry in France. There are a number of projects,—one to recognize one of the two excellent schools, to which are attached as professors several American dentists, and another to allow the practice of dentistry to remain free; but a third one is the most likely to go on record shortly as a law. It is to the effect that all dentists must at least take the lower medical degree (*officier de santé*) or become doctors of medicine, so that future dentists will be as good as doctors.—*T. Linn, M.D., in Phil. Med. Times.*

THE

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ORIGINAL COMMUNICATIONS.

DENTAL CARIES.—II.

BY A. MORSMAN, M.D., D.D.S., IOWA CITY, IOWA.

(Continued from page 535.)

PART FIRST.—PREDISPONENTS.

2. Errors of Calcification.

Preliminary Considerations.—By calcification of the teeth, or dentinification, as it is sometimes called, is meant the metamorphosis of soft tissue, formed as to shape into hard tissue,—the dentine and enamel of the tooth. The period covered by the process antedates eruption, and has no reference in this paper to subsequent changes in the tooth.

We are concerned in this connection with the manner in which this change occurs, the time of its continuance, and the place or places upon the matrix where the first hardening begins. The substance of both the dentine and enamel is represented in soft tissues, and the crown of the tooth is fully formed both in shape and size before hardening begins. The process of hardening is similar to ossification of bone in a matrix of cartilage. A point or points of deposit are formed, and from these the calcification extends in all directions until the once soft tissue has become entirely changed by the impregnation of lime-salts throughout its substance, it (the soft tissue) becoming the organic matter of the tooth, which we can again isolate by treatment with acids, and which again when so isolated represents the size and form of the tooth. This should not convey the impression that the hard tissue or lime-salts are simply deposited in the meshes or fibers of this organic matter. *No union could be more intimate.* Both are changed so as to lose their identity, and are merged into the new substances which we call dentine and enamel.

We need not here go into the details of this process. It will suffice that we bear in mind that enamel and dentine are simultaneous in their formation, or nearly so, and proceed from the same points of deposit; the enamel from within outwards, the dentine from without inwards; the dentine in globules, layer upon layer, upon the external surface of the gradually receding pulp, until it reaches the proper pulp size,—nature's type,—that wonderful limitation to further progress which appears alike in the crystals of inorganic and the perfected forms of organized matter.

The deposit as a formative process may now be said to have ceased, but it has become a *pulp function*, and is continuous through life,—so greatly lessened, however, as to be almost inappreciable normally; but under abnormal excitation it may be increased to a rapidity that will soon result in entire obliteration of the pulp.

The enamel cells or columns are the internal epithelium of the enamel organ, and it is in these cells that the deposit takes place.* Beginning at the end of the column contiguous to the pulp, and at the periphery of the cell, it extends towards its centre or axis, and simultaneously towards the distal end of the prism, uniting with adjoining cells that are undergoing the same process. The axial portion of the column does not calcify as rapidly as the periphery, and *at eruption* has not attained the same hardness.

Enamel when first formed has a chalky appearance, and is not hard and glassy as when erupted.

The time at which calcification begins, as indicated by the appearance of the "dentine-cap," is for the temporary teeth during the sixteenth and seventeenth weeks of intra-uterine life. In the permanent set calcification appears as follows: In the incisors, cuspids, and bicuspids, the first month after birth; in the first molars, the sixth month of fetal life; in the second molars at the third, and in the third molars at the twelfth, *year* of age.† With the exception, therefore, of the third molar, all the permanent teeth are in process of calcifying during the first five years of childhood, a period especially subject to infantile disorders.

The place of first deposit is in all incisors at the cutting-edge of the tooth, and appears as a line of dentine extending across the matrix. In all teeth having cusps these become the points of first deposit. From these first points calcification extends throughout the matrix.

Description of Abnormalities.—Errors of calcification present varied appearances, from a microscopical pit to an almost entire

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* Tomes's "Dental Surgery," page 254.

† Legros and Magitot, "Dental Follicle."

absence of enamel. *Pits* or depressions in the enamel surface are exceedingly common. They may be deep with abrupt sides, or shallow and "scooped" in appearance. They occur singly or in groups, but in the latter case usually extend horizontally across the tooth. The bottoms are usually covered with enamel. When very extensive, the tooth is said to be "honeycombed."

Grooves extending across the face of or encircling a tooth are also common, and may be accompanied by a corresponding elevation or wrinkling up of the adjoining enamel. There may be several parallel grooves at regular intervals with elevations between, giving the so-called "stepped" appearance.

Fissures or breaks in the continuity of the enamel differ from the above in extending entirely through the enamel and in being of irregular appearance. They occur upon the masticating surfaces of the molars and bicuspids, and at the cingulum (when developed) in incisors and cuspids. They are usually regarded as examples of arrested development, but I think incorrectly. They are rather instances of imperfect union between portions of enamel. I have said that calcification began in the cusps of these teeth (bicuspids and molars), and from these points they extend throughout the matrix. Take, for example, a qudracuspid molar,—the four points would extend towards each other until, meeting, they would coalesce. On a flat surface their union would probably be perfect, but the surface is not flat, and in the angular concavity the prisms are brought in nearly end to end contact, and imperfect coalescence could easily result.*

The same condition exists when the cingulum or basal ridge is developed upon an incisor.

It is probable that the fissure on the buccal surfaces of lower molars is formed by coalescence, hence *its* liability to be imperfectly calcified.

Patches of brownish or yellowish color and of greater or less extent often appear upon the molars and bicuspids. They are of much softer texture than normal enamel. They are an exaggeration of a normal condition, namely, the imperfect hardening of the central portion of the enamel prisms. Although predisposing to caries, they have less influence than might be supposed.

Leber and Rottenstein † describe two cases of congenital *white patches* in enamel, accompanied by greatly diminished consistence.

Notches sometimes appear upon the edges of the incisors, usually the upper centrals. I do not think they are often the seat of caries.

* Magitot, "Dental Caries," page 20.

† "Dental Caries," page 71.

A very peculiar condition is sometimes seen in the enamel of the bicuspids and first molars. At a certain height on the surface of the tooth a shoulder is formed, and the tooth is then continued, but diminished in size, looking like "a small tooth growing out of a large one." (Fournier.) I have seen but one case of this kind. In that the lesion was well marked upon all the bicuspids and first molars. Upon the latter the shoulder was about the middle of the tooth, while upon the bicuspids it was close to the articulating surface. All the teeth were of inferior organization, and more or less carious. The gentleman was a transient patron, and I could obtain no history.

Mr. Tomes describes a granular condition of enamel in which the normal prismatic calcification is wanting.

Defects of dentine can hardly be called *predisposing* causes of caries, as the enamel must first be penetrated ere this tissue can be acted upon, but they accelerate the disease, and have thus far a causative relation.

The interglobular spaces of Czermack are inclosures between unusually large dentine corpuscles, or aggregations of corpuscles, filled with a substance resembling bone plasma,* or, acording to Tomes,† the globules may coalesce so as to isolate an unimpregnated portion of the matrix, which is therefore simply a cavity containing soft tissue.

This condition of the dentine presents under the microscope a granular appearance, that is normal beneath the cementum, but abnormal beneath the enamel. Defects of enamel are usually accompanied by defects of dentine.

In describing these lesions, I have not referred to those conditions common to all, which we will now consider.

First, homologous teeth are usually affected alike.

Second, teeth calcified at the same time have the blemish at the same level, and those calcified at different times may have the same blemish, but at a different level, represented by their differing degrees of calcification; as, for example, a groove appearing upon the cuspid near the point would appear upon the incisors several lines nearer the gum; the latter being earlier in development than the former.

The first consideration points to a systemic cause. The second points to a definite time at which that cause was active,—namely, the time that the affected portion of the tooth was undergoing calcification. We are, therefore, irresistibly forced to the conclusion that these lesions are due to arrest of development.

I have already given the cause of fissures. They differ from other defects in being errors of union rather than due to arrest of devel-

* Wedl, "Pathology," page 45.

† "Dental Surgery," page 283.

opment. We find them in normally-formed enamel, showing no signs of developmental errors. They are not due to systemic disease, and occur alike upon all teeth having more than one point of calcification.

Causation.—We have now reached "deep water." If but one tooth show defects of calcification, while its homologue is free from such defects, then we must assume a local cause; as, possibly, an abscessed temporary tooth. Such cases are not common, and a systemic cause must be invoked to explain an evident arrest of development.

The temporary teeth do not so frequently show these lesions. When defective, the cause must be sought in parental influence, because these teeth are calcified prior to birth, and are beyond future influences.

The first molar begins to calcify during the sixth month of intrauterine life, and would be to a slight extent subject to the same conditions as the temporary teeth.

As might be expected, the second and third molars, are almost free from these defects, showing the limitation of the cause to the earlier years of childhood. We must look, therefore, to those diseases incident to this period.

Hereditary Syphilis.—The potency of this influence is undoubted. Indeed, it is the only recognized cause affecting the temporary denture. In regard to the permanent denture, it is questionable if we have not given it too much prominence. It should never be *assumed* to be the cause, save when it can be demonstrated to have been existent, and when no other causative influence is visible.

The bulk of testimony is to the effect that this disease is not only a cause, but the *principal* cause, of defects of calcification, and that certain defects, as the Hutchinson notch, and the peculiar condition affecting the bicuspids and molars above described, are specific. As to the latter claim, the syphilographers are probably correct, but the former is too sweeping an assertion. Hundreds of cases are seen where syphilis is out of the question, and where there is not the slightest history to indicate it. There is another reason for doubt in this matter. Lesions of calcification are almost always abrupt, and indicate plainly the commencement and termination of the influence. Syphilis is a continuous disease, and ought to produce usually a continuous effect; hence I cannot regard those lesions which indicate a short-lived cause as due to syphilis directly, and should suspect some other cause, although I could not find it. It is common to assume that the syphilitic taint can do anything bad, and, once its existence is determined, no further effort is made to find the origin of anything obscure.

Eclampsia.—According to the observations of Magitot, infantile convulsions are a common cause of erosions. In a large number of cases he traced the defects to convulsions occurring at the time when the tooth was in formation, and found no other assignable cause.

In my own practice I have seen two cases traceable to this cause. It is exceedingly difficult for the dentist to investigate this subject, and but few have done so. Much depends upon the parent's memory, which is quite commonly inexact.

Rachitis.—At first glance it would seem, from the nature of this disease, that it would be certain to cause dental imperfections. It is a bone disease. It is caused by arrest of development. It comes at the formative period of the teeth. Still, it is doubtful if it has much effect. Certainly it cannot often be a cause, because it is a comparatively rare disease. We cannot deny its influence, but regard it as infrequent. It is well known that it retards the eruption of the teeth, and this fact becomes one of the diagnostic signs of the disease. It is also true that rickety children quite often have good teeth.

Eruptive Fevers and Skin Diseases.—The teeth are dermal appendages, and it is reasonable to suppose that they are more or less directly affected by those influences which act upon dermal structure, supposing such influences existent during their formative period. The hair and nails are affected in this manner; why not the teeth? Many skin diseases are of syphilitic origin, and could thus account for the effect of that disease at a stated interval, the subordinate lesion being abrupt and of short duration. Many of the eruptive fevers, as scarlatina, are very depressing in their effects, and require the whole vital force to throw them off.

Scrofula has been mentioned in this connection. There is not the slightest evidence that it has any influence.

Rheumatism, Diphtheria, and Fevers.—Many times no adequate cause can be found for these lesions, unless we consider as such some prostrating disease. When we bear in mind the fact that often in these diseases the system of the little sufferer is doing work, represented by consumption of tissue, much greater than any day laborer, we will recognize that *all* its vitality is used in combating the disease. Often these diseases leave serious sequelæ, and there is for a long time a general stunted condition of the child. I do not think it is assuming too much to say that their potency extends to the forming teeth.

Conclusions.—I have shown that this condition has probably many causes, and that we are not justified in attributing to any one apparent cause all cases alike. Rather we should by patient search endeavor to verify our observations. Unfortunately, dentists have

done but little of this kind of work. They should do more. The field is a large one, and promises excellent results.

(To be continued.)

NERVOUS MATTER AND PRINCIPLES OF NERVOUS ACTION.

BY GARRETT NEWKIRK, M.D., CHICAGO, ILL.

(Read before the Illinois State Dental Society, May 13, 1885.)

In the material world around us the forces are the physical and the chemical. In the vegetable there is superadded the mysterious force we denominate vital. In animal life alone do we find the nervous.

The distinctive feature of the animal kingdom, from the lowest to the highest forms, from the simplest to the most complex, is the possession of nervous matter, either in visible structure or as a property of protoplasmic fluid.

In man we have the same physical, chemical, and vegetative forces that exist in external nature, but in a sense these are all subordinated to the energies resident in his mass of nervous tissue.

The first step in the division of nervous tissue is into the gray and the white. These two are intimately associated and correlated. They lie side by side in brain, and cord, and ganglion. There is no abrupt line dividing them. They are, as it were, interlaced. The gray tint is not suddenly but gradually effaced in the meshes of the white. Of the two, the gray matter is the more homogeneous—more distinctively cellular in structure. The white tends to parallelism of arrangement more and more as it recedes from the gray till it completes its purpose in the formation and distribution of nerves. The white is the firmer of the two, not so much by inherent difference of constitution, but rather by the addition of interstitial layers of fibrous connective-tissue. Consequently we find the gray matter so placed as to receive the best possible protection from external causes of injury. In the cord it is inclosed and protected by the white, and both are guarded from injury by a most ingenious arrangement of the bones that form the spinal canal—an arrangement which permits a certain amount of motion without danger to the great nerve trunk. Within the skull this order is reversed. The gray matter is on the outside—spread out, so to speak, on the surfaces of the convolutions, and lies just within the cranial walls. But it is well protected from shocks.

First, the skull is double-plated, the two plates being in places somewhat separated by spongy bone.

Secondly, three distinct membranes lie between the skull and the gray matter, forming together a protective cushion.

Again, the arrangement of the folds or convolutions is such as to permit a degree of lateral movement of the folds themselves, valuable as against the shock of external violence.

This arrangement of the gray matter on the surface and in folds allows the placing of the greatest amount with the least thickness at any given point; and if an organism so jelly-like were otherwise arranged, it would be in danger of breaking down by its own weight, or the weight of other matter, or from jars, shocks, or congestion.

We may say of the gray matter that it is the center of animal life and action. So far as we know, there is no form of life where the white exists without the gray, or some form of protoplasm which represents it. And the white is servant to the gray,—subordinate both in motion and sensation.

Fig. A.

Fig. B.

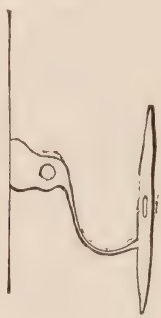
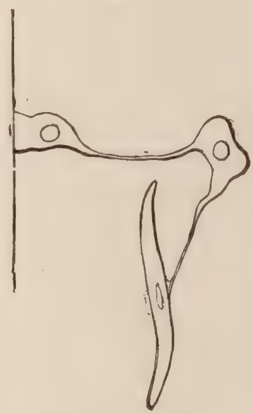


Fig. C.



Regarding the structure of gray matter, it is sufficient for our purpose here to say that it is little more than an aggregation of nerve-cells, with just sufficient connective nerve-tissue to hold it in form.

But as we know the constitution of the ocean by the analysis of a single drop of water, so we may understand quite well the character of nervous matter in mass when we have learned the structure and habits of a single cell, or a series of connected cells.

We have in Fig. A a simple sensitive nerve-cell, with a motor appendage, as found in some of the lower forms of animal life. In Fig. B a higher form is represented, where the sensitive cell is connected by a nerve to a muscular cell. Fig. C illustrates another advance in organization; a sensitive cell connected by a sensitive nerve to a central cell, which in turn communicates by a motor nerve with the muscular cell.

This last is the triple alliance—the triangular base of the higher order of nerve-structure. Given an understanding of this simple series, and you have the underlying principles of all nervous action. Multiply first the sensitive cells into millions of such cells. Let these be distributed through all the tissues of the body, but chiefly on the surfaces, internal and external. Each cell is to take cognizance of whatever comes in contact with itself. It is an intelligence officer to the central cell.

By the term sensitive we mean all cells which receive impressions from without and transmit to the center, and this whether the mind be conscious of the impression or not—whether the center be the brain or cord, or a simple ganglion.

The sensitive cells perform a vast amount of work dis-sociated from mental consciousness. The mind is not troubled by the ordinary and healthy processes of organic life. These are under the control and supervision of the lower ganglia, with which the sensitive cells of the heart, lungs, and other vital organs communicate. In fact, the sensitive cells take cognizance of many things of which the mind cannot be cognizant—insensible properties, such as exist in deadly poisons. The sensitive cells are the sentinels on guard at every outpost; they preserve every interest in every tissue. By this intelligence nutrition is regulated and supply made equal to the demands of waste; upon their information glands secrete in due amount, and the circulation is hastened or retarded.

But we must let our minds be plainly impressed with one distinctive fact as to the sensitive cell. It does not originate anything, so to speak. It is simply an informer. It is not a governing cell. It is a news reporter, but not an editor. Its only connection with the central office is by wire, and its function is to send messages but never to receive any.

Each sensitive cell has its own wire; so we assume, although it cannot be demonstrated but that a small group may use the same line—namely, a filament, a nerve fibrilla, a part of the so-called sensitive nerve. This wire transmits but one way. The sending office is always at the same end, the peripheral; the receiving is the central cell. The central is a cell of gray matter either in ganglion, cord, or brain. The gray matter would seem to be the seat of independent power. It sets in motion. It develops energy. It has a will of its own. It sits as a ruler and a governor.

Now, the whole mass of gray matter of the great cerebro-spinal ganglion is simply an aggregation—a myriad multiplication of the central cell.

We have seen that the sensitive cell has but one office and relation to the system, viz., to transmit messages from periphery to center.

In its simplest office the central cell has at least a double relation. First, it receives the impulse sent by the sensitive cell. Second, an amount of energy is at once developed according to the impulse received, and manifested without hesitation in the direction indicated.

A finger of the hand is pricked by a needle. The central cells are almost simultaneously informed; a sufficient energy is induced to withdraw the hand. The time taken for it all is quite infinitesimal, but there is no mistake made between hands or a hand and foot. The nerve fibrilla by which the message goes to the muscle to withdraw the hand differs in no wise, so far as we can see, from the fibrilla which carried the message of information. They seem to be but simple wires. But they do not lie in contact. A bundle of one kind is laid together inclosed by a common sheath, and when we see it we call it a sensitive nerve; a bundle of the other kind we say is a motor nerve, because we have learned by experiments what offices are performed by each.

So far as we know, the peripheral or sensitive cells do not associate so as to pass impressions from one to another, although a great multitude may be simultaneously affected by the same cause. Thickly distributed as they are, they are distinct. They are distributed in and upon other tissues.

But the central cells exist in mass. The gray matter contains barely enough connective-tissue to form a skeleton and supply blood. The central cells, therefore, are not only intimately connected with the sensitive cells by the sensitive nerves, and contractile tissue by the motor nerves, but also with each other.

So the cell, receiving an impulse from the periphery, may associate with itself a thousand cells of equal power, and, multiplying the force a thousand times, send it on the instant by as many motor fibrils to produce contraction.

The change in the muscle cells is a measure only of the change in the central cells.

Common substitutes for the words *sensitive* and *motor* are the terms *afferent* and *efferent*, meaning to convey in and out. So the central cells are said to convert afferent into efferent impulses, or sensation into motion.

Having seen how a slight afferent impulse may be multipled by the central cells into a manifestation of force greatly disproportionate (as, for example, in a case of convulsion from slight peripheral irritation), it is evident there must be some means of limiting such extreme action; otherwise there would be continually, as there is occasionally, in abnormal conditions, great waste of energy.

So there are, first, limitations of anatomy, so to speak. The cord and brain are in segments or divisions, each division being set over

special parts and functions. The dividing lines may not be traced, but there is no doubt of the fact of their existence. Therefore, an afferent impulse sooner or later reaches a point beyond which it may not readily go.

Secondly, there are certain tracts, so it is believed, the office of which is inhibitory. That is, it is their business to "put on brakes." We know there are such tracts of matter in the brain, because, by stimulating certain nerves that proceed from these parts, we can slow the action of the heart and lungs. Medicines like veratrum viride and digitalis act upon certain central cells, and through them by fibers of the pneumogastric and spinal-accessory nerves. Stimulation of these fibers inhibits heart action,—reduces the number of beats per minute.

When we speak of a nerve, the idea in our mind is ordinarily that of unity. We think of the nerve as one thing. But let us examine for a moment one of these, say a spinal nerve.

A spinal nerve consists of two nerves. These have entirely different offices. They go together merely for the sake of convenience,—first, in getting out of the bony canal in which the cord lies, and, second, convenience of distribution. But we call the two together a nerve. Let us say, for illustration, it is a rope of two strands. These strands are made of threads, and the threads are bundles of fibres or filaments. We can see the rope, the two strands before they join, or we can separate the coarser threads so that they may be seen with the naked eye, but the filaments only with the microscope. Unlike the strands and threads of a rope, however, the parts of the nerve are not twisted upon each other, but lie parallel, inclosed by a common sheath.

The diameter of the fibrilla varies from the $\frac{1}{1000}$ to $\frac{1}{10000}$ of an inch. Supposing the average to be $\frac{1}{5000}$, and multiplying this into itself, we have 25,000,000 as the possible number in a cord containing the equivalent of a square inch.

If Chicago were connected with the outside world by a like number of telegraph wires, these wires, laid as closely as possible, would fill four of the principal streets fifty feet deep. Allowing forty wires to each person, it would require the services of every man, woman, and child in the city to operate them.

But the aggregate of the diameters of the nervous trunks of the body would be not one but several inches.

The two strands of the rope—the spinal nerve—are to all appearances and analysis alike, yet they convey energy only in opposite directions. One (the posterior) is the afferent wire, conveying impressions from without inward. The other is the efferent wire, conveying motive force from the central cells to parts without.

These lines, as electricians say, complete a circuit. Suppose, for example, a needle-point enters my finger. The sensitive impulse goes by the fibers of the afferent strand to the central cells in the spinal cord. From the central cells a motor impulse is returned by the efferent branch to the arm, hand, and finger, to withdraw from the offending body. The point of departure of the sensitive impulse is the terminal point of motor energy, and the circuit is complete. It is possible, too, that the hand may be withdrawn as soon as or even before I am conscious of pain. How is this?

It is thought that only the cranial nerves have an immediate, direct connection with the brain; that sensations going by way of the cord advance by relays, as it were. That is, the sensitive dispatch is first received by the central cells in the gray matter of the cord, and by these re-transmitted along the lateral or posterior columns to the centers of consciousness. But while the re-transmitted message is going upward, the motor impulse has already gone outward to withdraw the member. By thus taking the matter in hand, the spinal cells save time, and even the thousandth part of a second is valuable where a hand is in the fire. If deliverance always had to wait for the longer circuit of consciousness and will, the amount of injury might be greatly increased.

Co-ordination of Voluntary Muscular Movement.

This is certainly one, if not the only, office of the gray matter of the cerebellum.

This co-ordination is one of the most wonderful results of life which our eyes behold. It begins to be manifested before birth. Then, as we watch the movements of an infant newly born, we observe that while these are weak and awkward, there is something of regularity and correspondence, showing that the organs have taken their first lessons. Day after day witnesses an increase of nervous rhythm and muscular agreement. As the child grows the co-ordinating powers are educated. When he first wills to walk, he falls. It is only after many trials and repeated failures that he is able to maintain a position of equilibrium above his feet.

Think what a difference there is between such manifestations and those of the acrobat or bare-back rider in Barnum's circus. What a difference even between the movements of the ordinary pedestrian and the first attempts of his babyhood.

Listen to the ceaseless tread of the great human army marching to and fro upon our streets; watch the daily panorama of complex activities that moves before your eyes. Stand and wonder and admire the strength and the precision, the grace and the beauty of movement, that join and flow together from the fountains of co-ordination!

But the chief glory of the human organism is not found till we climb beyond nerve and cord, medulla and cerebullum, to the gray matter of the cerebral convolutions. Here dwells the king. Here in this mysterious chamber are wrought the still but mighty works of intellect, affection, and will.

Other animals may be immeasurably superior to man in bone and muscle, equal or superior in certain co-ordinations; may have finer organs of special sense; but in the one thing of cerebral gray matter, the organ of thought and reverence and benevolence and will, he stands alone upon the earth, having "dominion over all."

Underlying Principles of Manifestations of Nervous Energy.

I presume we have all of us often asked ourselves, What is the underlying principle of this transmission of nervous energy, motion, or sensation? What is it that travels along the nerve? Does anything really travel? We have heard of ethereal fluid, nervous fluid, electrical fluid,—an intangible, indefinable something supposed to whirl along the nervous lines like a cash-ball on the track in a modern retail store. Is there any such thing? I take it that all these operations proceed on the principle of contact. It is entirely a matter of touch.

The sensitive cell is simply the ultimate cell exteriorly of a series of cells. It is the extreme end of a nerve-filament. The first cell being touched, touches the second, the second the third, the third the fourth, and so on till the central cell is reached. What matters it that all is done in an inconceivably short space of time? It is touch, vibration, modified tension,—as you please to name it.

Suppose you could have a man stand out before you, and then, by a word, annihilate or throw off absolutely everything of him except his nervous system. What would he look like? Why, the form of the whole man would be there, less hair and nails. He would be a very nervous man, to be sure, but he would demonstrate most clearly the perfect diffusion yet unity of nerve-tissue. You might be able to see that the nerve-filaments are but fingers, millions of microscopic fingers, reaching out to touch the things in which the brain and cord have an interest. Touch the periphery anywhere, and you touch the center. It is all on the principle of contact of atoms and the *communion of matter*.

Our knowledge of the telephone may perhaps be made to assist in making the idea more clear to our minds. The construction of the telephone is simply this: Two vibratory membranes are connected by a wire. So we have in contact—air, membrane, wire, membrane, air. The man at one end sets the air in motion, producing sounds with his vocal organs, varying in intensity and number

so as to constitute what we call speech. The man touches the air, the air the membrane, the membrane the wire, the wire the membrane. and this again the air; and the air touches the other man,—his ear. So by these media the two men touch each other. The one makes impression upon the other by certain nicely adjusted movements which he has been educated to make. The other understands the movements because he has been similarly educated both to make and to perceive. It is a mode of motion.

Again, here are two telegraph operators,—one in Chicago, the other in New York. A wire connects their offices and certain cups or jars. In these jars are certain chemicals which produce atomic disturbances of a definite sort. The communication of this disturbance to the atoms of the wire is under the control of the operator. He can continue or break it at will by means of his finger on a key or button. By training, he has learned to break with varying intervals,—short breaks, long breaks, combination of breaks, so as to make an alphabet and spell words. In so doing he is playing on all the atoms of the wire, and by them the breaks or sounds are registered or reproduced at the other end, and understood by the other man. Now, the man may do all this without understanding the process at all, aside from certain mechanical executions, just as men have been talking for ages without knowing they had vocal cords. But you see that the telegraph, as well as the telephone, is simply a practical use of one of the modes of motion, and an adaptation of the principle that atoms everywhere touch.

The world is under tremendous pressure. There is tension everywhere. Every object in some way, directly or indirectly, touches every other object. But by the isolation of certain lines of atoms, as in the telephone and telegraph wires, we are able to control and utilize the *sensitiveness of matter* in a definite way, and for a definite purpose.

So our nerves are merely isolated lines of atoms. The terminal sensitive cell touches the central, and the central in turn touches the lines of atoms that provoke contractile energy. And so we have sensation; and so we have motion.

THE TREATMENT OF DEEP-SEATED ABSCESSES WITHOUT EXTERNAL INCISION.

BY JOHN S. MARSHALL, M.D., CHICAGO, ILL.

[Read before the Minnesota Dental Society, August 1, 1885.]

By deep-seated abscesses I mean those cases of alveolar abscess which have extended beyond the ordinary limits, and have involved more or less extensively the structures of the jaw, with a tendency

to necrosis, or have penetrated the antrum of Highmore or escaped from the neighborhood of the maxilla, and have burrowed downwards between the muscles of the neck, as frequently occurs in abscesses associated with the inferior teeth.

Ordinarily the diagnosis of these cases is not difficult, but occasionally the cause has proved troublesome to find. Abscesses discharging into the antrum, or the nasal fossa, and producing offensive discharges, have been diagnosed as chronic catarrh. One case occurring in the practice of Dr. Edward Maynard, of Washington, D. C., caused by an unerupted inferior wisdom tooth, and discharging into the larynx, setting up an irritative cough with expectoration of pus and mucus, was previously diagnosed by the physicians to be acute bronchitis; others discharging at some point upon the side of the neck have been set down as abscesses originating in the cervical glands, the result of scrofula.

That such abscesses often prove to be serious affections, endangering the health, and sometimes even the life, of the individual, are well-established facts.

I purpose, however, in this short paper to confine my remarks to the more common, and, from their location, the more dangerous class of these cases, viz., those originating from disease of the inferior teeth.

The tendency of the suppurative products in these cases is downwards through the external wall of the alveolar process, and to point at the lower margin of the jaw; but it also happens—especially with the molars—that instead of pointing at this location it opens through the internal wall of the alveolar process, and burrows downwards between the muscles of the neck, and may discharge into the throat, or through the external tissues at various points from the submaxillary triangle to the superior border of the clavicle. Any suggestions, therefore, in regard to the treatment of these cases which will tend to cut short the suppurative process, lessen the dangers to health and life, avoid the necessity of operating with the scalpel in a location requiring such delicate dissections and fraught with so much risk to the patient, or to prevent the unsightly and ofttimes disgusting scars which follow the external opening of these abscesses, will I think be of interest. The treatment frequently adopted in cases of alveolar abscess is the removal of the cause by the extraction of the offending tooth, trusting to nature to complete the cure.

In extreme cases of this deep-seated variety an incision is made through the external tissues at the lowest point of the abscess, for the purpose of drainage. In those cases, however, where the pus has burrowed deeply into the tissues of the neck it is quite likely

that more than one pocket will be formed; consequently the treatment by incision becomes complicated, and sometimes, from the dangers of an extended operation in the superior or inferior carotid triangles, would be precluded altogether.

The surgeon, under such circumstances, has had no alternative but to wait, trusting that the abscess would find an opening for itself at less risk, before the patient should die of pyæmia. The treatment which is suggested comes to our relief in this emergency, and from past experience I am prepared to say, at least, that the duration of these cases can be materially shortened, and many of them speedily cured, without resort to any other operative procedure than the extraction of the diseased tooth and the injection of peroxide of hydrogen into the sac.

Ophthalmologists and aurists have found this agent very useful in the treatment of diseases of the eye and ear, with purulent and muco-purulent discharges, and dentists have been signally successful with it in the treatment of pulp-chambers with putrid contents, in ordinary alveolar abscesses and in pyorrhea alveolaris. By injecting an abscess of the deep-seated variety with peroxide of hydrogen, introduced through the alveolus of the extracted tooth, the purulent contents can be thoroughly evacuated.

The oxygen is set free on coming in contact with the products of decomposition, which distends the cavity and forces out the pus through the alveolus by mechanical pressure. Two or three injections of from a half drachm to an ounce, according to the extent of the abscess, may be required to completely remove the purulent matter, and if given opportunity it will search out and purify every hidden receptacle. I have had several opportunities since its introduction to the notice of the dental profession, by Dr. Walter Coffin, of England, at the London International Medical Congress in 1881,* to test its efficiency in this class of cases, and in extensive periosteal inflammations of the jaws.

In one case, a Mercy Hospital patient, Mary N., Irish, aged twenty-four years, was suffering from a deep-seated abscess associated with the right inferior wisdom tooth for several weeks. The patient was confined to her bed for twenty-six days, with pulse ranging from 100 to 116, and temperature from 101° to 104.8°. She was speedily relieved by extracting the tooth and evacuating the pus. The abscess extended down the neck four and a half inches below the margin of the gums, as was ascertained by the probe. The pulse dropped from 104 to 96 and the temperature from 104.8° to 103° within two hours after the operation. A half ounce of the peroxide

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*Transactions of the Seventh International Medical Congress.

was ordered to be injected into the abscess every four hours. This was followed by a decrease in the temperature of one degree each day for three days. The patient then refused to submit to the further use of the remedy at that time, as the evolution of the gas, by distending the sac, caused pain. An increase in the pulse rate and an elevation in the temperature immediately followed. On the fourth day afterwards the pulse was 101 and the temperature 104°.

The peroxide was again used as before, and the pulse and temperature again rapidly fell, but through the obstinacy of the patient the treatment could not be carried out with any degree of satisfaction; still the fact was established that the remedy antisepticized the pus and evacuated the sac, as indicated by the rapid improvement in the symptoms.

Another case was that of a little girl, aged eleven years, with an abscess originating from the right inferior first molar and extending into the tissues of the neck, accompanied with extensive swelling and tenderness, but with no acute pain. The swelling of the parts had followed an attack of severe pain in the tooth and jaw, from which she had suffered three weeks previously. For a week the jaws had been closed, and the only food taken each day was a little milk. The child had been confined to bed for a part of the time, and when presented for treatment looked decidedly ill. The tooth was extracted under ether, and the pus cavity found to extend downwards three inches below the margin of the gum. Very little purulent matter followed the extraction of the tooth, but on injecting the pocket with the peroxide large quantities were evacuated. The injections were continued once daily for six days, when the patient was pronounced cured, all discharge having ceased, and the swelling nearly disappeared. Under the ordinary treatment I should have expected to have seen the trouble continue for a much longer period, and perhaps to have seen the abscess point low down on the neck.

One other case was that of a lad nine years of age, who had received an injury of the inferior jaw by a fall from his bycicle, resulting in an extensive acute periostitis, involving the teeth and jaw from the second temporary molar of the left side to the ramus of the jaw on the right side. All of the teeth between these points were loose; pus exuded from the gums at the necks of the teeth, and I feared extensive necrosis. The treatment adopted was injections of peroxide beneath the gum at all points where pus was found to exude. The condition at the anterior part of the mouth began to improve at once, but opposite the first permanent molar at the lower margin of the jaw it was necessary a few days later to open an abscess which was about to point there. The injections were kept

up for two weeks; all discharge had then ceased, and the teeth had become firm.

Dr. Harlan has recently called attention to the use of this agent in purulent conditions affecting the maxillary sinus,* and I would suggest that it will be found equally valuable in the hands of the surgeon in nearly every variety of suppurative inflammation, especially in periostitis, necrosis, and deep-seated abscesses, where there is difficulty in completely evacuating the purulent matter by the ordinary means.

THE TREATMENT OF DENTAL LESIONS BY COMPRESSED WARMED AND DRIED AIR.

BY H. C. REGISTER, M.D., PHILADELPHIA, PA.

Warm air has been used to a limited extent in the surface-drying of cavities by means of the hot-air syringe, but compressed warm air has a much wider range of application, and compressed warmed *dried* air has a still greater range. Some of its uses in a general way I will briefly indicate: As an obtundent of sensitive dentine in the preparation of cavities; for the thorough removal of moisture from both vital and devitalized teeth before filling; the antiseptic treatment of devitalized teeth and roots; the thorough drying of roots before attaching artificial crowns, making a hermetically sealed joint; in putrescent conditions of the teeth—especially useful when associated with peridental ulceration; in the bleaching of discolored teeth; in the treatment of fistulæ and abscesses; in ulcerations of the antrum and nasal passages; in recession of the gums and pyorrhea alveolaris, etc. By this means the detached gum can be lifted from the tooth by a steady jet of air, allowing an inspection of the parts and the removal of the calculus. By the same apparatus anesthesia may be produced by atomization, rendering operations on the gums painless. By the same means fillings of the oxychloride or phosphate of zinc can be perfectly crystallized before the fluids of the mouth are allowed to come in contact with them.

In bleaching discolored teeth, the greatest cause of failure, I apprehend, has been the presence of moisture in the dentine, preventing the absorption of the bleaching agent, and which the mere drying out by absorbents or even with the ordinary hot-air syringe does not affect. By gently forcing into the cavity an uninterrupted stream of warmed air under pressure, it reaches the terminal ends of the tubuli in both crown and root. If the bleaching agent is then introduced it will permeate the organ throughout its extent. I have seen discolored teeth of many years' standing thus restored to

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* Archives of Dentistry, page 204, May, 1885.

within a few shades of their healthy neighbors in less than thirty minutes.

Sensitive and hypersensitive dentine is effectually obtunded by a careful application of warmed air at blood heat. The application in such cases requires care to avoid pain at the outset. The air should be kept at about blood heat and the jet under ready control. In some cases it may be well to secure a surface effect from one of the obtunders in common use, such as carbolic acid, tannin, or atropia, after which the warm air can be used; and just in proportion as the moisture is removed, just in that proportion has insensibility been produced.

In putrescent conditions the air should be heated to from 100° to 125° F., and the current maintaind until every particle of decomposed matter is rendered innocuous by thorough drying. In such cases I have never seen subsequent peridental irritation, and if in this condition the tooth be hermetically sealed, safety from further trouble is assured.

In pyorrhea alveolaris the disengaged folds of gum may be thrown back by a steady jet so that an examination may be made, which would otherwise be impracticable, and the progress of the disease may frequently be retarded, and in some cases a cure effected, by forcing medicinal agents by atomization into the pockets. Fistulous tracts which refuse to heal under ordinary treatment yield when the medicinal agent is forced through them under air pressure. In a word, nothing since the introduction of the rubber-dam and dental engine has given me such positive results as warmed compressed air.

CORRESPONDENCE.

CONCERNING SEPARATORS.

To the Editor of the Dental Cosmos:

It is to be regretted that in the carefully and laboriously prepared article in the August number of the Dental Cosmos, on the history of the screw separator, Dr. Perry should have failed to mention the fact that from 1878 or '79 to the spring of 1882 he did no work on the separator *practically*, however much of "a thinking" he may have kept up.

He was only aroused to again begin work upon the instrument by seeing my model in an incomplete stage in the hands of Dr. C. L. Browne, and for nearly an entire year he frequently borrowed and used this instrument.

The separators designed by me were first publicly exhibited before

the profession on May 6, 1884, at the clinic at the depot of The S. S. White Dental Manufacturing Co. So I fail to understand Dr. Perry's statement that he knew nothing of them, for he was present on that date at the evening meeting of the First District Dental Society.

One might easily infer from the article that the haste was such to get a separator called the Perry separator on the market that only a few weeks after it appeared it had to be withdrawn to be improved.

Had Dr. Perry been frank with me, as I certainly meant to be with him, I should gladly have shown him over a few of the difficulties of which he complains in this article, and which I necessarily have met.

Some of these difficulties have been conquered, though at the expense of more than forty different instruments constructed during the experiments, which have extended over a period of perhaps five years.

The S. S. White Dental Manufacturing Co. requested my models in May, 1884, for the purpose of manufacture, but I did not think that the instruments had been sufficiently tested to justify me in acceding to the request, and I shortly left for Europe. In a very few months the advertisements of the Perry separators appeared, with the results mentioned.

However, now that he has undertaken to perfect what may fairly be called the Perry separator,—i. e., the instrument with double screws,—I have great confidence, from my knowledge of his skill and ingenuity, that Dr. Perry will present the profession with a really valuable appliance, and I give him my sincere good wishes for that end.

E. A. Bogue.

No. 29 East Twentieth Street,
New York, August 10, 1885.

CORRECTION FROM DR. PEIRCE.

To the Editor of the Dental Cosmos:

The report of my remarks before the New Jersey State Dental Society, published in the September number of the Dental Cosmos, is on the whole very satisfactory; but in the third paragraph, page 525, the proof-reader, by a very natural transposition of the sentence, has made me speak of the *Echinus* as Aristotle's lantern, when it is only the pentagonal pyramid, which consists of five teeth embraced in their sockets, constituting the oral apparatus of this animal, that is so termed.

C. N. Peirce.

Philadelphia, September 14, 1885.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION--TWENTY-FIFTH ANNUAL SESSION.

Second Day.—*Morning Session* (*Continued*).

(Continued from page 553.)

Sections I and II not being ready to report, Section III, Dental Literature and Nomenclature, was called.

Dr. Atkinson read a paper entitled "Ripening and Ripeness," which was a description of his view of the process of development by the awakening of the latent energy in atoms, which are assumed to be unoriginated eternal bodies having motic and static possibilities; following the successive steps through the formation of the molecule, the corpuscle, tissue, organ, and system; and then tracing the various forms in which matter is presented to the consciousness of man through ether, gas, vapor, cloud, water, colloid, and solid.

Dr. Taft, chairman of the section, reported also a paper by Dr. W. O. Kulp, of Davenport, Iowa.

Dr. Kulp then read his paper, which was entitled "Nomenclature," and which, after referring briefly to the lack of a systematic nomenclature, proceeded as follows:

Recognizing this lack of system, and having the fact of the necessity of some uniform method forced upon me as a teacher in this branch of our profession, I adopted a nomenclature in operative dentistry which proved highly satisfactory to me in the final examination of my classes, and I have reason to believe is fully as satisfactory to the majority of the individual members of the classes. I therefore present it to the profession through this body, at least as an aid in the right direction, if not adopted as I present it as a whole:

Names of the Teeth.

1st. Central Incisors, right and left, upper and lower.
2d. Lateral Incisors, right and left, upper and lower.
3d. Cuspids, right and left, upper and lower.
4th. Bicuspids, 1st and 2d, right and left, upper and lower.
5th. 1st Molars, right and left, upper and lower.
6th. 2d Molars, right and left, upper and lower.
7th. 3d Molars, right and left, upper and lower.

The Surfaces of the Teeth are divided as follows:

1st. Including the six anterior teeth, above and below (Incisors and Cuspids).
  1st. Labial surface.
  2d. Lingual surface.
  3d. Proximal surface.
  4th. Occluding surface.
2d. Bicuspids and Molars, above and below.

1st. Buccal surface.
2d. Lingual surface.
3d. Proximal surface.
4th. Occluding or grinding surface.

3d. Division of surfaces longitudinally.
1st. Grinding or occluding surface third.
2d. Middle third.
3d. Cervical third.

This division embraces the tooth from and including the cutting edge to the alveolar process.

4th. Subdivision of surfaces of the individual teeth.

1st. Right and Left Central Incisors, above and below.
'a' Labial surface.
'b' Lingual surface.
'c' Occluding surface.
'd' Centro-proximal surface.
'e' Latero-proximal surface.
(Occluding, middle, and cervical thirds).

2d. Right or Left Lateral Incisors, upper and lower.
'a' Labial surface.
'b' Lingual surface.
'c' Occluding surface.
'd' Centro-proximal surface.
'e' Cuspo-proximal surface.
(Occluding, middle, and cervical thirds.)

3d. Cuspids, right or left, upper and lower.
'a' Labial surface.
'b' Lingual surface.
'c' Occluding surface.
'd' Latero-Proximal surface.
'e' Bicuspo-proximal surface.
(Occluding, middle, and cervical thirds.)

4th. 1st right or left Bicuspids, upper and lower.
'a' Buccal surface.
'b' Lingual surface.
'c' Grinding surface.
'd' Cuspo-proximal surface.
'e' Bicuspo-proximal surface.
'f' Bicuspo-fissure.
'g' Buccal cusp.
'h' Lingual cusp.
(Grinding, middle, and cervical thirds.)

5th. 2d right or left Bicuspids, upper and lower.
'a' Buccal surface.
'b' Lingual surface.
'c' Grinding surface.
'd' Bicuspo-proximal surface.
'e' Molo-proximal surface.
'f' Bicuspo-fissure.
'g' Buccal cusp.
'h' Lingual cusp.

(Grinding, middle, and cervical thirds.)

6th. 1st upper Molars, right and left.

'a' Buccal surface.
'b' Lingual surface.
'c' Grinding surface.
'd' Molo-proximal surface.
'e' Bicuspo-proximal surface.
'f' Central fissure.
'g' Cross fissure.
'h' Posterior buccal prominence.
'i' Anterior buccal prominence.
'j' Lingual prominence.
(Grinding, middle, and cervical thirds.)

7th. 2nd upper Molars, right and left sides.

'a' Buccal surface.
'b' Lingual surface.
'c' Grinding surface.
'd' Molo-proximal surface.
'e' 3d Molo-proximal surface.
'f' Central fissure.
'g' Cross fissure.
'h' Anterior buccal prominence.
'i' Posterior buccal prominence.
'j' Lingual prominence.
(Grinding, middle, and cervical thirds.)

8th. 3d upper Molars, right and left sides.

'a' Buccal surface.
'b' Lingual surface.
'c' Grinding surface.
'd' Molo-proximal surface.
'e' Posterior surface.
'f' Central fissure.
(Grinding, middle, and cervical thirds.)

As the forms of the lower molars differ somewhat from those of the upper, and the locations of attacks of caries vary somewhat, I found it necessary to extend the classification, to cover only the grinding and buccal surfaces, all other surfaces coming under the same names as the upper molars.

9th. Lower Molars, right and left sides.

'a' Buccal surface.
'b' Lingual surface.
'c' Grinding surface.
'd' Proximal surface, as in upper molars.
'e' Buccal pit fissure.
'f' Central fissure.
'g' Lingual cross fissures.
'h' Buccal cross fissure.
'i' Posterior fissure.
'j' Anterior fissure.
'k' Lingual posterior prominence.
'l' Lingual anterior prominence.
'm' Buccal prominences, same as in upper molars.

Dr. C. W. Spalding, St. Louis. There has long been felt—most severely by those engaged in teaching—the want of an exact definition of terms, especially in the mechanical and manipulative departments. Dr. Kulp's paper was carefully considered, and the terms were made as brief as possible in the short time at the disposal of the section. The paper is only a beginning, but he hoped the study of it would lead to the extension of the work in other directions.

Dr. A. H. Thompson, Topeka, Kansas. Why does Dr. Kulp reject "mesial" and "distal"?

Dr. Kulp replied that the main object in preparing the original list of terms, which was arranged for the use of his class, was to enable the students to comprehend more quickly what he was teaching in his lectures. If "mesial" or "distal" were used, many students would have to hunt up the dictionary; while, if the terms given in the paper were used, they knew at once what was meant. The scheme can be extended far beyond the limits laid down in the paper.

Dr. J. Taft, Cincinnati, thought the subject of correct nomenclature one of very great importance. With regard to the nominations which have been suggested by Dr. Kulp, they are certainly more definite than any that have been offered heretofore. Many of the terms have been in use before, but they have nowhere else been systematized. It might be well, to save tautology, to have more than one word, in some cases, to signify the same thing, to allow an opportunity for the interchange of the two. For example, Dr. Kulp uses the term "occluding surfaces" frequently. The speaker would suggest, also, for the same surfaces the word "masticating." Dr. Taft thought "proximal," which Dr. Kulp substitutes for "distal," a better word for the purpose than the latter.

Dr. W. N. Morrison, St. Louis. Some seventeen or eighteen years ago Drs. Homer Judd and M. S. Dean produced a little monograph on terminology. The terms there given have been quite extensively employed in St. Louis and Chicago. They used "mesial" and "distal," instead of the more complicated terms given here.

Dr. W. H. Morgan. One word as to "occluding surfaces." As applied to the twelve front teeth, it is incorrect. The incisors do not occlude when in a natural position; neither do the cuspids, which have practically no occluding surfaces. These teeth do not occlude when at rest, and very frequently they do not when in use.

Dr. Spalding. When the report was under consideration by the section, it was suggested that but one word be used to apply to the corresponding surface of all the teeth. We were aware that "occluding" does not properly apply to the front teeth, but there seemed to

be fewer objections to it than to any other term which was suggested. If any of the others had been adopted, we should have had to multiply the terms, which it seemed important to avoid. With regard to "mesial" and "distal," the objections to them are that they are not plain English; they have no particular advantage over the term proposed as a substitute, and they would be more liable to mislead.

Dr. Atkinson. Whenever we attempt to classify we should have but one standard,—nature's. Occlusion is the one word to express the coming together of teeth. No one ever had teeth worn down without occlusion and friction.

The subject was passed, and Section IV, Operative Dentistry, was called. Dr. E. T. Darby, chairman, read the report, which was brief, submitting a paper by Dr. J. A. Robinson, of Jackson, Michigan, and recommending discussion of the following subjects: "Bridge-work," to be opened by Dr. E. Parmly Brown; the "Herbst Method," to be opened by Dr. M. L. Rhein; the "Perry Separators" and "Matrices," to be opened by Dr. E. T. Darby. The section reported also that Dr. H. B. Noble would explain his method of adjusting a porcelain half bicuspid crown; Dr. C. C. Southwell would show and describe his "breath-guard," and Dr. A. E. Matteson would explain a new dental splint invented by him.

Dr. Robinson's paper, which was entitled "The Painless Operation," was read by Dr. Barrett. It expressed the writer's belief that of all the preparations in use by dentists nothing else is equal to carbolized potash to give relief from pain. When the pulp is alive and bleeding, it can be capped with impunity with any of the oxyphosphates, by applying clear carbolic acid to paralyze the pulp and then the carbolized potash to cauterize it and form a hard eschar. When the pulp has been devitalized it can usually be extracted painlessly by making an application of hydrochlorate of cocaïne solution on cotton for ten minutes before opening the pulp-cavity; then a second application of the solution, pressing the cotton hard against the root containing the pulp and allowing it to remain for ten minutes before inserting the broach.

Dr. E. Parmly Brown, Flushing, L. I. In considering the subject of "Bridge-work," it is well to commence about 2300 years back to see how new it is. Dr. Van Marter has presented in the *Independent Practitioner* some evidences of the art as practiced more than 2000 years ago. But you can imagine from his description what a "give-away" it was when the person wearing the piece laughed. The modern lady, with a piece of bridge-work in her mouth, can raise her lip and smile, but she must not laugh or talk, or she will show the golden horseshoe encircling her teeth. The speaker had devised

a style of bridge-work which allows the wearer to laugh, or talk, or eat, or gape, without exhibiting artificiality. The case here shown embraces six teeth. The metal band is not seen, because it is baked into the piece. In ordinary bridge-work the pins are the weakest point, and teeth are frequently broken from them. In the style which the speaker advocates, to cause a break it would be necessary to fracture the whole tooth from the shaft which runs through the piece. In addition to having the band baked in them, the teeth are fused together.

Dr. G. R. Thomas, Detroit, Mich. How about the strain on the natural teeth, from so many artificial teeth being made dependent on one, two, or three natural teeth?

Dr. Brown. That applies to all bridge-work. There is no special difference between the plan just described and other methods in that respect.

Dr. M. L. Rhein, New York. When the Herbst method of filling teeth was discussed at the Saratoga meeting, none of us really knew the true principle of the work. Since that time he had seen Dr. Bödecker operate, and had spent a good deal of time in learning the method, and had now used it for the last nine months. He had modified the method in his practice, in that he does not complete the work according to Herbst's plan. The chief advantage of the Herbst method is the better adaptation of the gold to the walls of the cavity which it secures,—a fact that has been established by clinics before the First District Dental Society. Another advantage is that the work can be done in a shorter time. A third advantage is that the patient will suffer less while the tooth is being filled; there will be less nervous shock. Another recommendation is that, in approximal cavities in bicuspids and molars, the more extensive the operation the easier and quicker in proportion can it be accomplished by this method. The only disadvantage, and it is a great one, in the speaker's opinion, is that the gold is not as thoroughly condensed as by the mallet, especially the electric; and it was for this reason he had modified his application of the Herbst method, as had Dr. Bödecker and others who used it. The modification consists in putting in a certain portion of the filling with the burnishers, and then completing it with the mallet, thus getting on the surface all the density required, while having the advantages of the ease of manipulation and the saving of time for the greater part of the work which the Herbst method bestows. He believed that by this plan all the disadvantage above spoken of, if it is a disadvantage, is got rid of. Dr. Herbst does not admit that more gold can be packed into a given space with the electric mallet than by his method; but none of us, on this side the Atlantic, have been able to condense gold as per-

fectly by his method as with the mallet. The main features of the Herbst method are the reduction of all cavities to the simple form and the use of matrices. [Dr. Rhein here passed around a number of teeth which had been filled by Dr. Herbst out of the mouth, which he said would illustrate the idea better than anything else.] The most difficult teeth to fill by this method are the incisors. If it has done nothing else, the Herbst method has given to the profession the best form of gold, in regard to softness, it has ever had.

In reply to questions as to whether tin could be welded with the revolving burnishers, Dr. Rhein said that he had never done it, but Dr. Herbst claims that he has. The gold is welded. As received it is like butter in its softness, and it goes readily into the most minute crevices.

Dr. E. T. Darby, Philadelphia, remarked that what he had to say about separators was said for his friend Dr. Perry. The separators themselves were illustrated and described in the DENTAL COSMOS for August. He also wanted to call attention to some new forms of matrices and a new method of holding them in position. He was indebted to Dr. J. A. Woodward for the first suggestion, and also for some of the forms of the matrices.

First, as to the separators. Dr. Perry was one of the first to follow Dr. Jarvis in the use of the separators which the latter gentleman first introduced to the profession some ten years ago The new ones which are shown here are improved forms, which Dr. Perry has devised after much thought and many experiments. They are nicely adapted to each type of tooth, and they are not readily displaced. The bows are more out of the way, and you are able to control the pressure.

The matrix which he presented he had called Dr. Woodward's, who should have the credit of its invention. It can be made of steel, phosphor-bronze, brass, or copper. The lug which rests on the masticating surface of the tooth was left to keep the matrix from being driven into the gum. There is no danger of the matrix tilting. The small serrations on the side of the matrix are to assist in holding the wooden wedge in position, though he uses a wedge of steel instead of wood, the temper of which is about that of a Lord sickle scaler, to avoid danger of its breaking. The steel wedges are put in place with a socket handle, which is then unscrewed, leaving the wedge in position. The matrix holder which he had invented retains the matrix firmly in place, and also acts as as a separator.

Dr. H. B. Noble, Washington, D. C., presented a method of adjusting a half-bicuspid porcelain crown, which he described as a modification of the How crown and screw, with which he supposed all

were familiar. When the inner cusp is in good condition, it makes a very pretty and a very strong operation to mount a half-bicuspid crown in place of the outer cusp, leaving the inner cusp of the natural tooth remaining.

While he was on his feet, the speaker would mention that Dr. Donaldson, whose broaches, or bristles as they are called, are so well known, has recently made a machine to cut the barbs on the broaches, and those now turned are exactly what dentists want.

Dr. C. C. Southwell, Milwaukee, showed a simple apparatus for directing the breath of patients away from the operator, which he designated the dental breath-guard. It consists of a curved metal plate fitting and resting upon the upper lip, with a staple in the center, to which the shield proper is attached by means of a lug. The shield itself is a wide plate, the sides of which when in place extend up to and a trifle beyond the wings of the nose, while the top almost touches the tip of the nose. It is held in place by means of an elastic band attached to the lip plate and passing around the head. Directly underneath the nares the shield is deeply curved to permit the passage of the air. It can be adjusted readily to throw the exhalations of the patient's breath to the right or left, and is worn without discomfort to the patient.

Dr. A. E. Matteson, Chicago, showed a new dental splint, and related a case in which it had been used successfully to show the method of construction. A boy, twelve years of age, while teetering, fell, knocking out the central and lateral incisors of the left side, and breaking the process. There was considerable difficulty in getting the process back to place, but after this was accomplished the two teeth which had been knocked out, after having their pulps removed and the pulp cavities filled with gutta-percha, were replaced, and an impression of the parts was taken, from which a metal cast was made. A gold cap, covering the injured teeth and those on either side, was then swaged up and fitted and cemented to the teeth. (See Fig.) The boy was shortly afterwards taken East by his parents, and on again presenting himself, some six weeks after the splint was removed, the teeth were apparently firm and the broken process healed.

Dr. F. H. Gardiner, from the Clinic Committee, announced that clinics would be given in the afternoon at 2 o'clock.

Adjourned.

The afternoon was devoted to clinics, and the evening session, by special agreement, was set apart to hear the report of Section V, Anatomy, Histology, and Microscopy.

The consideration of Section IV, Operative Dentistry, was resumed at the morning session of the third day.

Dr. W. O. Kulp, Davenport, Iowa, described his method of attaching artificial crowns. There are many very good methods, he said, of crowning teeth. The crown known as the Büttner is excellent for single-rooted teeth; but he found many roots of a conical shape where it cannot be used. In such cases the How crown is an excellent device, but it had to him an objection because he would have to use amalgam in setting it; and he therefore sought for a method not open to this objection. In the Büttner method a ring is cut on the outside of the root, to which a ferrule is fitted. The method which the speaker pursues is exactly the reverse of this, the inside of the root being cut out, and into this the crown is fitted. He has never had so much satisfaction with any other crown as with this. [Dr. Kulp then passed around a case containing examples of the method he advocated.]

Dr. E. Parmly Brown thought that there were two serious objections to the plan proposed by Dr. Kulp. The first is the reaming out of so much of the root, especially in small teeth, and where the tooth-substance is good. We do not want to run any risk of splitting the root. The second objection is that the taking of an impression is necessary. The speaker has devised a number of different methods of mounting crowns, some of which he has abandoned because they were too complicated. He has just perfected another idea, in connection with the bridge-work which he had just described, which seemed to be all that can be wished for. The pin is flattened and is baked into the crown, and instead of hollowing out the porcelain where it incloses the pin, as in the Logan crown, he adds more porcelain, so that it extends up on the pin beyond the body of the tooth, the root being countersunk slightly to receive the crown. A crown so made can be ground away just as well without taking the porcelain from around the pin.

Dr. Kulp. The objection to Dr. Brown's crown is that it has no support at the edges, while in the one advocated by the speaker the tooth rests in a concave cup, which prevents the splitting of the root and as well the ingress of fluids.

Dr. C. S. Stockton, Newark, N. J., had lately completed a piece of bridge-work where the only natural teeth remaining in the jaws were the six front teeth, one bicuspid on the right side, and the two wisdom-teeth of the lower jaw; and the six front teeth and the two wisdom-teeth of the upper jaw. The occlusion was very bad. When

the jaws were closed the upper front teeth were covered from sight by the lower teeth. Attempts had been made to supply artificial dentures, but the pressure of the jaws made it impossible for the patient to wear them. The first step was to cap and raise the wisdom-teeth so that they occluded as they should do normally; the upper incisors then closed slightly inside of the lower teeth. Caps were placed on the cuspids, and the spaces were filled in the ordinary style of bridge-work. The gentleman for whom the work was done could not be induced to go back to his former state.

Dr. E. Parmly Brown. With regard to the Herbst method, it may be good, but it is not the best. It takes us back to the old-fashioned hand-dentistry, when the good inside dentine was cut out and a frail wall holding a soft mash was left to stand the strain of mastication. No tooth which is left in this condition is to be compared in durability with a tooth prepared as M. H. Webb prepared them and filled as he filled them.

Dr. J. D. Patterson, Kansas City, had procured the Herbst instruments when they were first introduced, and he had made many experiments with the method, but his practical experience is that it is unreliable for general use. A certain class of cases only will admit of its employment to advantage. Where a contour operation is required it is inadmissible, and the class of cavities that will admit it can be better filled with soft or unannealed foil. In his opinion, the fillings put in by the Herbst method at the clinics yesterday will fail in from six months to a year.

Dr. G. C. Daboll, Buffalo, thought the matrix the best merit of the Herbst system, though he does not approve of the forms of the Herbst matrices. For twenty years he has used Jack's matrices, and has advocated their use in cases where they are an advantage, and has frequently clinicked with them to show their value. He is positive that cases to which their use is adapted cannot be filled so easily and surely in any other way, for the reason that their employment simplifies the work, making practically a crown cavity of an approximal cavity. They are not, of course, adapted for the front teeth, but for approximal cavities in the bicuspids and molars they should always be employed.

Dr. W. A. Spaulding, Minneapolis. The Herbst method may be good, but the operations in which it was employed at the clinics yesterday were begun by that and finished by another method. His idea is that the proper way is to fill the cavity well, by whatever method is practiced, and we are in a better position to do whatever is best for individual cases as they arise by having many ideas at command. He finds many cases where he cannot use matrices; others again where they are an advantage. We should ex-

ercise our own ingenuity instead of practicing any one method to the exclusion of others.

Dr. W. C. Barrett, Buffalo, liked to get at basal principles in the discussion of subjects like that now under consideration, and he disliked the narration of individual cases. The methods of filling cavities may be reduced to about three. The old method of forty years ago used soft foil, wedging one piece upon another, until the cavity was full. For this we must have a foil the pieces of which will slide freely upon one another without cohering. That method preserved the teeth as well as any other, but it could not be employed when a contour operation was needed. Then came the method by which cohesive gold is made solid by the impact of a plugger. This necessitates a starting point, and the gold is built up solid, even to the restoration of contour. The Herbst is still a third method. It is not intended, in the opinion of the speaker, for contouring. Each of the older methods has its particular advantages and the Herbst has its own valuable features. If you want to pack gold into the inequalities of a rough, uneven surface, it cannot be accomplished by the impact of a sharp point. It must be done by burnishing the gold down. That is the principle on which the Herbst method is based,—that absolute contact between the gold and the walls of the cavity can best be produced by burnishing. The speaker believed that contact between the gold and the walls can best be produced by the Herbst method; but if you wish to build up, to restore contour, or to give the gold within the cavity the highest specific gravity, it is not the thing; it is necessary then to have the impact of a blow. The dentist should have all these methods at command. In a frail tooth the speaker would use the Herbst method in starting the filling, to secure perfect adaptation of the gold to the walls, and when near the conclusion of the work use the mallet to make a solid surface for mastication. The man whose way is always right and everybody else's wrong does not succeed so well as he who is prepared to adapt himself to circumstances.

Dr. E. Parmly Brown. Wherever gold is put into human teeth to supply the place of lost tooth-substance, it must be made absolutely solid. If there is a place in the interior of the tooth where gold may be left as it is left when put in by the Herbst method, it would be better to use oxychloride or oxyphosphate, because they act as non-conductors. The speaker has challenged a trial of the Herbst method with the plan he uses, but the other side want to fill glass tubes in the trial. Of course they can make beautiful work in this way, but the practical test in the mouth is what he wants.

Dr. Rhein. The secret in the Herbst method lies in the peculiar kind of gold used, and that has only been available here since last

summer. It is the softest that has ever been introduced into dentistry, but when it is properly put in it is as solid as if the filling were made of cohesive gold. He would not offer the fillings put in yesterday as good examples of what can be done by the Herbst method. None of the gold used was annealed. He does not believe the work can be done with ordinary golds. Some work that he did by the Herbst method last September he saw recently, and it was as perfect as when the case was dismissed. With reference to Dr. Brown's strictures, he would say that he was a pupil of Dr. Webb's in the matter of preparing and filling cavities before Dr. B., and he claimed to understand Dr. Webb's methods. There is no difference in the preparation of the cavity, except that we do not hollow out the walls for the Herbst method, and no retaining-pits are made, because there is no need for them. The whole secret of the method is in the proper adaptation of the matrices. Dr. Herbst has shown much ingenuity in adapting them to the anterior teeth. It is just as necessary to have good strong enamel walls for the Herbst method as when the mallet is used, and at the conclusion of the operation the gold should be malleted in. Dr. Brown said that oxyphosphate should be put in the bottom of the cavity. Very true. When the cavity is deep we use it in the Herbst method, in the same way, but when the cavities are not deep we cannot take up too much room with the oxyphosphate. Perfect adaptation at the enamel edges is necessary. As long as you prevent leakage from the exterior, it does not make any difference whether a portion of the atoms of gold in the interior are not absolutely welded.

Dr. L. C. Ingersoll, Keokuk, Iowa. Two or three principles appear to be developed by the Herbst method which have not been named in the discussion. We know that when two smooth surfaces are brought together and the atmosphere excluded from between them, they are held in contact by atmospheric pressure. He doubted if any method of filling teeth by atmospheric pressure would be successful. Dr. Herbst contends that contour operations can be performed by his method. Dr. Rhein says the same; others deny it. Are there not two varying principles in the minds of these men? It is found, in filling by this method, that gold will adhere to the instrument. This is caused by the development of electrical attraction, induced by the friction of the revolving instrument. The same attraction is likewise developed in the gold, rendering it cohesive. May it not thus be possible to do contour work with non-cohesive gold by developing electrical attraction (cohesion) during the operation?

Dr. W. H. Atkinson, New York, has been using a gold for three years made up with platinum and iridium. Its advantages are that it gives a harder surface to chew upon. It is to softer golds

like steel upon the point of an instrument is to the iron. Another advantage is its color, which approaches more nearly to the color of the teeth. Its principal place is as a facing for fillings on grinding or cutting surfaces. This preparation adheres beautifully to ordinary gold. He prefers to anneal before putting it into the cavity, and the hotter it can be carried from the lamp to place the easier it is worked. In platinum and gold combined the only advantage over pure gold is the color. He wanted something that, besides having a better color than gold, would be harder and wear better, and this answered the purpose very nicely.

In reply to a question, Dr. Atkinson said that the lowest number he used was 30, but he generally employed Nos. 60 to 240.

Dr. W. W. Allport, Chicago. In a filling for a tooth we must have sufficient hardness to exclude moisture and resist mastication, but beyond that hardness becomes a disadvantage, an injury to the tooth. At the meeting in Boston the speaker made the remark that the essential difference between cohesive and non-cohesive gold was the simple and only fact that the pieces of the latter would slide freely over each other, enabling one to readily put in perfect work, while the former required great skill on the part of the dentist to make a fine operation. There are some who insist that cohesive gold must be used all the time, but he does not believe that one of them will say that more teeth have been or will be saved than were preserved by the old operators with soft gold. He contended that no one ever saw better fillings than those were. In filling a cavity you want the material that will most readily spread under the instrument, and that will not clog or draw away from the walls. That material is soft gold. When you want to build up a tooth to restore a portion of its contour, you need cohesive gold. Filling a cavity and making a tooth are two entirely different operations. What he said last year about the Herbst method—that there was just sufficient good in it to cause a great many persons to adopt it, and sufficient evil to cause a great deal of mischief in the practice of those who do adopt it—he still believed, and he would repeat now that while in some cases it may be good, for every-day practical work experience will demonstrate that there is not much in it. He is more confirmed in this belief by all that he sees of its use. How are you to use straight instruments in undercuts or uneven-surfaced cavities? He is of the opinion that whoever uses the Herbst method extensively in his practice will have the reputation in a few years of being a very poor dentist. If he were to use it in his own practice he should fill the cavity by some other way, and finish with the Herbst method.

Dr. G. R. Thomas, Detroit. Any man who ties himself to one

method will surely see his patients suffer from his narrowness. One may be able to make good operations, and yet be a poor dentist. There is danger of carrying the cohesive gold method too far. If a man can produce as good results with soft gold and hand-pressure as with cohesive gold and the mallet, it is due to his patients that he should do so. There is more danger of over-operating than of not operating enough. Dr. Daboll advises the young men to use the matrix. So does the speaker—after they have learned to do good work without them.

Dr. H. J. McKellops, St. Louis, would like to ask Dr. Allport what he calls cohesive and non-cohesive gold, and why he uses a lamp in his office. The speaker had seen Dr. Allport operate, and he puts the foil in the flame of the lamp so that the point of the pellet will stick. That makes it cohesive; yet Dr. Allport says he operates with non-cohesive gold. There is almost nothing in practice more beneficial than the matrix first brought out by Dr. Jack. So highly does the speaker esteem it that, in his opinion, almost the first thing taught to the young man studying dentistry should be how to put it in place and use it. In approximal cavities, where failure of fillings so often occurs, the use of the matrix is a necessity. He had used all manner of golds. Dr. C. F. Wheeler had sent him some iridium gold, but it was not pleasant to work. Then he had tried the Rowan platinum gold, but he could not work it satisfactorily, even with the lamp to anneal it. The platinum gold which gives him the best satisfaction was first sent to him by Dr. Blake, of California. With care he can produce almost any color desired by the use of this preparation; fillings properly made can scarcely be distinguished across the table.

Dr. Frank Abbott, New York, has had some experience with the Herbst method, and he had devised a set of instruments for hand work on the same principle, because he could not use the straight instruments of the system in all cases, as in undercuts. It is not safe, in his opinion, to depend on the Herbst method for the whole operation. He contoured one tooth with the Herbst instruments, operated by the engine, but it went to pieces in two weeks under the strain of use. His fault may have been in using instruments somewhat roughened instead of the smooth burnishers, but he did not believe the method was suited for contour work. With reference to the bridge-work advocated by Dr. Brown, he thought it the finest system of the kind now in use. It admits of the gum being seen all around the teeth, and the soft tissues are not irritated. The tongue comes against the porcelain tooth, instead of the flat surface of the gold band, as in ordinary bridge-work.

(To be continued.)

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a regular monthly meeting, Tuesday evening, June 2, 1885, in the rooms of The S. S. White Dental Manufacturing Co., Broadway and Thirty-second street.

The president, Dr. William Carr, in the chair.

Dr. C. F. W. Bödecker, chairman of the Clinic Committee, made the following report: The clinic to-day was poorly attended, as is usual at this time of the year, when very few gentlemen can spare the time to give to the clinics. We had, however, two operators, viz., Dr. C. S. W. Baldwin, of this city, and Dr. Newell, of Elmira. Dr. Baldwin operated upon a right upper central, filling a labial cavity which extended up under the gum at the cervical portion of the tooth. An application was made of the oleate of cocaïne, which in the doctor's opinion has a greater effect upon sensitive dentine than the aqueous solution. He excavated the cavity, and, as it was expressed, there was some reaction of the cocaïne. The cavity was filled with "1000-fine" gold foil, No. 3, by hand-pressure and the hand mallet. Dr. Newell exhibited a "New Mode" celluloid heater in operation. He also explained some new features in making plates before extracting the teeth. Dr. Baldwin has also brought with him to-night the model of a case showing a very peculiar malformation or malposition of a molar in place of the right upper central, which I pass around for examination.

Incidents of Office Practice.

Dr. Frank Abbott. Some two months ago a lady consulted me in regard to a left superior first molar from which the pulp had been removed and the canals filled with a zinc cement. In the region of the ends of the buccal roots was a swelling about the size of a large pea, which was the seat of almost constant pain. The history of the case as then given was that some six weeks previously the pulp had been destroyed, in due time removed, and the canals filled, and that since that time the swelling had been present over the buccal roots with more or less pain. I made three or four applications of aconite and iodine, which reduced the swelling and eased the pain,—to return, however, in a few days, and again the aconite and iodine was advantageously employed. Several days elapsed, and the painful symptoms again returned, but this time without the swelling. For a week or ten days I was able to control the pain, so that life was not altogether a burden to her, but finally it started up with renewed energy, and becoming desperate she determined to have the tooth extracted. I extracted it, supposing, of course that there would be

no more trouble in that neighborhood. She left the city the next day for a fashionable country resort, expecting to regain her health and strength in a short time. In about ten days she again appeared in my office with the same severe neuralgic pain in that side of the face, the seat of which seemed to be about the floor of the antrum. I concluded that there was some congestion of the mucous membrane there, and that that was the cause of the pain. With a long, sharp engine-drill I penetrated the floor of the antrum and punctured the inflamed mucous membrane. The profuse flow of blood which followed relieved the congested condition almost immediately. After spraying the cavity with a solution of one to four of Listerine in water a few times, I provided the patient with a small spray-syringe and some of the Listerine solution, directing her how to use them. In about two weeks, when I again saw her, the pain had not returned, and the opening into the antrum had healed.

Dr. V. H. Jackson. I had as a patient a few days ago a professional man, all of whose teeth in the upper jaw back of the first bicuspid had been extracted, excepting a root of the second bicuspid and the three roots of the first molar on the right side. As there was some soreness in his face, resulting from the diseased roots, I extracted them, after which I handed him some water to rinse his mouth, watching him rather closely, as I expected some expression of gratification of the operation having been a painless one. To my surprise the water began to come through his nose, and on making an examination I found there was a free opening into the antrum. The alveolar process had been absorbed for quite a distance around the roots. The diseased condition yielded to treatment very readily. I have another case, that of a boy about twelve years of age, who had a supernumerary tooth where the cuspid should be, which had not yet erupted but was coming down. As the supernumerary tooth was pushing the cuspid forward out of its place, I proceeded to extract it, but found it did not yield readily, and giving it an oscillating movement I found that the adjoining tooth also moved. A further examination proved that the roots of the two teeth were united as far up as I could crowd the gum. After lancing the gum, I inserted a pledget of cotton and sent the boy away. The following day I endeavored to separate the two teeth by sawing between them, but they were united higher than I could reach even with an excavator. I decided to extract the teeth, and after doing so I found they were united the whole length of the roots. I sawed them apart, and reset the lateral incisor after smoothing the roughened side, and it is now perfectly sound and well.

President Carr. We will now have the pleasure of listening to Dr. Francis, the essayist of the evening.

Hygiene of the Mouth.

Dr. C. E. Francis. Mr. President and Gentlemen: I was not aware that I was to be an essayist to-night. I understood that the subject for discussion this evening was that very old-fashioned and thoroughly practical one of cleansing the teeth, and I was asked to say a few words by way of starting the discussion. I think that is it, Mr. President. However, I should probably have written a paper, but for the last three or four days I have been very much under the weather, and hardly able to attend to anything.

One of the most difficult and trying tasks connected with the duties of the dentist is to impress upon the minds of his *clientèle* the importance of keeping their teeth free from such accumulations as are usually found about their cervical borders; and even after much time is devoted to explaining to them the mischief to teeth and gums such collections are likely to produce, future examinations sometimes exhibit a laxity of effort on the part of even those who promise to heed our admonitions. In many cases, where teeth have been thoroughly divested of coatings of salivary calculus, every stain removed with the greatest care, the surfaces of enamel left in a smooth and cleanly condition, inflamed gums treated and restored to health, and the whole supplemented with a profusion of good advice, a few months later will find them in their former wretched condition. To be sure, the proprietors of such neglected treasures are the principal sufferers, but by no means are they the only ones affected by such dire neglect. On the principle that "like causes produce like results," teeth having been once attacked by caries are quite likely again to succumb to the elements of decay where the same conditions continue. Approximal and buccal fillings, even though introduced with ever so much care, if constantly menaced by agents of decalcification about their borders, are likely to become undermined and loosened, and where such is the case the dentist gets the credit of doing imperfect work; consequently his reputation suffers to a greater or less extent. It seems to be one of the most prominent failings of human mortals to saddle the responsibility of their own carelessness or neglect upon the shoulders of others, and in this way we all get our share of it. We owe it as a duty to ourselves, as well as to our patients, to urge them to take especial pains to keep their teeth in a condition of cleanliness, and we need also to instruct them how they can best accomplish this result. I am inclined to believe that with few exceptions our fraternity are remiss in this duty, and do not picture the serious danger that such neglect incurs. Every year's experience in my individual practice impresses more deeply on my mind the importance of teaching people *how* to take care of their teeth. I know it is not a particularly pleasant

duty to charge our patients with a lack of tidiness, and our criticisms may in some instances be viewed as an ungracious rebuke, and perhaps may by some of them be answered by emphatic assertions that their teeth get brushed two, three, or even four times a day, although their appearance might indicate that a tooth-brush had never made an impressive visit in their neighborhood. Nevertheless, as we have chosen the profession that calls upon us to preserve human dentures, we should practice it to the extent of our ability.

Very few individuals understand how to manipulate a tooth-brush to the best advantage. A few rapid horizontal dashes over such surfaces of the teeth as are easily reached is about the average amount of cleansing most dentures receive, and this little is too often applied where least needed for their preservation.

As regards tooth-brushes, not one in ten to be found in the market is fit for use. Most of them are too large, many too compact, and either too rigid or too soft. A brush less than the ordinary size will best reach the surfaces that need its services most. The bristles should be both elastic and pliable. If too compact and stiff, they fail to enter the interstices; if too soft, they force nothing from between the teeth. They should be well wired and the bristles finished so as to present a serrated surface. For cleaning the lingual surfaces of the inferior incisors, an ordinary flat brush is of not the slightest use whatever. A brush for this purpose should be a small tapered or pointed cone, with a bow-shaped handle.

In instructing my patients how to clean their teeth, I direct them to begin by placing the brush firmly against the extreme back teeth, perhaps on the right side, allowing it to touch the gum; then to gradually bring it forward with a somewhat brisk semi-rotary motion towards the front of the mouth, following both buccal and lingual surfaces, and with an effort to clear the interstices of all extraneous deposits; much as if holding on the brush handle a bundle of tiny toothpicks; this completed, to serve the opposite side in the same manner; then the upper teeth in like order. In this way the cleansing is done systematically and with a degree of thoroughness.

I imagine that very few people actually think or fully realize what they are doing when they are brushing their teeth. They pass the brush into the mouth and give a few of their teeth a rub, and that is about all. We should instruct them in such a manner that they can systematize the operation, telling them where to begin and where to end, and, after brushing, to rinse the mouth with plenty of tepid water, washing all the teeth thoroughly with it. I instruct my patients to brush their teeth at night. Probably the experience of all present has been that, when you ask your patients at what time

they brush their teeth, they generally reply, "In the morning." So far as actual preservation is concerned, it makes precious little difference whether teeth are brushed in the morning or not. Eating one's breakfast will accomplish this work to a certain extent; but from the evening until the following morning meal some twelve hours intervene, and during this time, if the teeth are loaded with extraneous matter, there is a chance for fermentation and its injurious results. By explaining this to our patients, they can see the importance of it themselves, and will be more likely to follow our instructions.

There are many pertinent questions asked by our patients, such as, "Where do these deposits come from?" "Does tartar come from smoking?" "I had it all taken off six or eight months ago; why does it come on again?" It is well for us to explain these things. They must not stop brushing because their teeth have been once cleaned. It is much like a man trying to clear the snow from a sidewalk while it is yet snowing; he must keep at it, for more accumulates when he stops work.

A few days ago an elderly gentleman, with a full complement of teeth, called upon me and requested me to examine them for cavities. I did so, but found none. I informed him, however, that his teeth were in a horrible condition, and completely coated with incrustations of extraneous matter. He asked what harm it did. I explained to him the mischief it caused. "But," said he, "you would not take it off?" I replied, "Unless you have it removed, your teeth will loosen." "But," said he, "if you take it off you will take all the enamel off, too." I told him he could leave it on if he pleased, but if he allowed it to remain his teeth would in a few years become loose and fall out. Even then he could hardly decide whether he would have his teeth cleansed or not, but finally decided to have the deposit taken off; and after the operation was completed he declared that his teeth felt very much better than they did before, and he was very glad that he had decided to have it done.

A few days ago a lady came into my office with a little girl some ten years of age, and said she wished to have the child's teeth examined. I being engaged at the time, one of my associates examined them. He informed the mother that the child's central and lateral incisors were decaying on their approximal surfaces. The woman was perfectly horrified, and acted as if she thought I was to blame for their condition. I looked at them soon after, and noticed that they were completely coated with a slimy green stain. Said I, "Can you expect anything better than decay where the teeth are so neglected and contain such deposits of extraneous matter?" Said she, "I brought the child here last year. You then said her teeth

were all right." I replied that on the occasion referred to the child left my office with her teeth in good condition, but it was many months since she was there. "But," said she, "they ought not to decay at her age." "No," said I, "they ought to be kept clean." "But what can *I* do?" she asked. I answered that, "if I had a rope attached to the child and could draw her into my office every week or two, I might prevent her teeth from decaying; but as this is impossible, it becomes your duty to look after the child's teeth, and not allow them to get into such an untidy condition." Many individuals seem to feel as though the dentist is responsible for all such troubles, no matter how much they neglect their own duties.

I think hardly a day of practice passes that I do not see two, three, or more cases where teeth have been seriously injured by allowing extraneous accumulations to form about them.

I regret, gentlemen, that I was unable to prepare a suitable paper for this occasion, but trust that what I have said will have the effect of starting a discussion.

Discussion.

Dr. Abbott. It is astonishing how men differ in little matters like this. Now, I differ from Dr. Francis quite materially upon several points. One is in reference to the kind of brush to recommend. In the first place, I believe in using neither a hard nor soft one, but what is known as a medium brush, and I believe the bristles should be *close together*, so that any movement upon the teeth will produce friction. I recommend to my patients a brush that has very small bunches of bristles set closely together and of medium texture. I do not believe in the little curved brushes spoken of by Dr. Francis for brushing the back surfaces of the lower front teeth, because there is only occasionally a person whose teeth stand in such a peculiar manner that an ordinary brush will not reach them. I venture to say there is not one person out of ten in this room who cannot brush the back or lingual surfaces of the lower front teeth without difficulty with an ordinary tooth-brush. The time of brushing the teeth is of great importance. I instruct my patients to use the brush twice a day, and to use toothpicks, floss silk, or anything that will remove particles of food from between the teeth after eating during the day. The time to use a dentifrice is after breakfast in the morning, for the reason that from then until noon it insures a clean and comfortable mouth. The teeth present to the tongue and lips a smooth, polished surface that is very agreeable and is appreciated by the patient. If food is taken again before evening, the tongue and lips with the aid of toothpicks and silk will remove all particles that lodge upon them. After the last meal

at night. I recommend brushing the teeth with water alone, and the use of toothpicks and silk. If there is a marked tendency to approximal decay, in addition to the above, I have obtained some excellent results from the use of alkaline washes, such as a solution of two drachms of bicarbonate of soda in eight ounces of water, to which may be added any favorite flavoring material; or plain lime-water may be used to advantage. The time devoted to cleansing the teeth should be very little indeed. Not long since I heard of a person who spent twenty minutes, two or three times a day, brushing his teeth. All the brushing that can be done to advantage at any one time requires less than two minutes, if the brushing is done systematically and properly. Injudicious brushing irritates the gums and causes them to recede. No more brushing should be done than is necessary to keep the teeth free from food and their surfaces polished.

Dr. Bödecker. Mr. President and Gentlemen: It seems to be the opinion of the first speaker that cleanliness is next to godliness; and I suppose that everybody knows that, in the mouth, it is in most cases true, but I do not think it is in every case. For instance, a lady who has been a patient of mine for two or three years, and who has pretty strong teeth, cannot be taught how to brush them properly. I have tried my best to teach her, and it seems impossible. Every time she comes to my office her teeth are in the same filthy condition. Of course, her teeth decay very fast. This lady has a brother, whom I saw two or three weeks ago for the first time, and he told me that was the first visit to a dentist he had ever made, and that he only brushes his teeth once or twice a week, and yet he has the most beautiful set of teeth I have ever seen. There is not a single cavity in his teeth, and not a speck of tartar on any one of them. If, therefore, everything depends upon brushing and the clean condition of the teeth, why should not this gentleman's teeth decay as well as his sister's, who I know attempts to brush and cleanse her teeth, although not in a proper manner.

Dr. Hodson. Does he smoke?

Dr. Bödecker. I do not believe he does, because there is no nicotine visible upon his teeth, nor a speck of deposit of any kind upon their necks. I think the decay or preservation of the teeth depends mainly upon the constitution of the patient and the character of their teeth as to organization. I think that, with perfectly organized teeth and perfect general health of the system, there is very little necessity for a tooth-brush. But, unfortunately, very few of the patients who come into our hands are in this happy condition.

Dr. J. F. P. Hodson. Granted the unfortunate quality of constitution that Dr. Bödecker speaks of. I think it is true that our pa-

tients must have some method of cleaning their teeth, quite as much as they must have our services. I endeavor to teach my patients how best to do those things. I entirely agree with the remarks of Dr. Abbott in regard to cleaning the teeth after breakfast. It is a thing I have always done myself, but I never quite had the hardihood to ask a patient to do it. It has always seemed to me to be a more or less dirty proposition to ask a patient to eat his breakfast upon all the deposits of the mouth that will be found in the morning after the night's sleep. I think it is an excellent idea, and I practice it myself; and I always have a much cleaner mouth during the day than I would, I think, if I had cleaned my mouth before breakfast and not after. But it is not a very pleasant suggestion to patients that they should eat their breakfast with their teeth soiled with a whole night's depositions. Another thing I would suggest is, that the tongue should be cleansed as well as the teeth. There is a deposition upon the tongue as well as upon the teeth, but few people think of it. I get a great deal of comfort out of the practice, and I think my patients do also. The principal thing that I have to quarrel with my patients about is that they do not cleanse the buccal surfaces of the molars. They allow the brush to slide over the top of the molars before it gets to the back of the mouth, and so the most dangerous place in the whole mouth is not taken care of at all. I take pains to point out to every patient the importance of reaching those places, and I show them how to do it.

Dr. Abbott. In regard to brushing the teeth after breakfast, my patients often ask, "Do you mean that I must eat my breakfast without brushing my teeth?" I answer that if they wash out the mouth with water they can eat their breakfast as comfortably as if they had used the tooth-brush. If the teeth are cleansed thoroughly before going to bed at night, I do not see how there can be much accumulation upon them in the morning. There is one question I wanted to ask: whether any gentleman present has noticed that patients who are under some particularly nervous strain depost tartar upon the teeth more rapidly than at other times? I have a patient, a physician, who is wearing a partial plate on the lower jaw. He was recently under unusual excitement for two or three days, and the plate which one day before when I saw it had no tartar upon it at all, the next day, twenty-four hours after, was incrusted to the depth of one thirty-second of an inch. I was quite astonished at this. I have had the care of his teeth for some ten years, and of course have been aware of the fact that tartar accumulated upon his teeth very rapidly, but I have never seen anything equal this.

Dr. Bödecker. From the remarks of Dr. Hodson, it might appear as though I did not advise my patients to cleanse their teeth, nor

think it was necessary. On the contrary, I do think it is necessary, and I said so, too. The cases I spoke of were exceptional cases of peculiar constitutions; and I think the constitution of the person as well as his habits has a great deal to do with the preservation of the teeth. With the majority of patients that come under our hands I believe, of course, that the cleaner they keep their mouths the better it is for them and the less decay will occur in their teeth.

With reference to Dr. Abbott's statement that a flat brush is better than a brush in which the bristles are uneven, I have to differ somewhat. I do not think the bristles of a flat brush can possibly reach the approximal surfaces of the teeth as well as a brush in which some of the bristles are a little longer than others. I have used a good many different kinds of brushes, and I have finally adopted that kind of brush that I speak of because I think it is the best. Dr. Abbott spoke of a nervous patient having a great deal more calculary deposit upon the teeth than ordinary persons have. I have noticed the same thing, and particularly that persons troubled with gout or kidney disease of any kind generally have a great deal more calculary deposit upon the teeth than any other class of patients that come under my hands.

Dr. M. L. Rhein. Mr. President, in regard to the question of salivary calculus being more rapidly deposited in the mouths of patients who have severe nervous trouble than in other cases, I may say that I have given a great deal of attention to the matter in treating pyorrhea alveolaris, and have taken particular note of those cases and the different temperaments of the patients, and I have found that in patients who have a great deal of nervous derangement this increased and extraordinary salivary deposit is almost invariably seen; and in cases of that disease where there is any gout, or kidney trouble of any kind, there is present a great deal of calculous deposit. But a great many cases of pyorrhea alveolaris have presented themselves to me where there were no symptoms of kidney trouble, and where there was greater nervous trouble existing than in the others, and in those cases there were absolutely no calculous deposits upon the teeth at all. The soft parts were affected; the gums were loose around the necks of the teeth invariably, so that you could pass your fine scalers up sometimes half way to the end of the root, yet not meet with any hard deposit,—nothing but soft deposit. Those are the cases which I considered most difficult to treat of all the different phases of this disease.

This matter of cleansing the teeth in general is a subject which I have given considerable attention to. Dr. Abbott in his remarks dwelt particularly upon the injury done by excessive brushing, which means too much friction used upon the surfaces of the teeth.

The point to be gained is, if possible, to cleanse the teeth without employing any friction at all; and if you can get a brush that will remove everything that accumulates there with the least amount of friction, you certainly accomplish the object in view with the least possible amount of wear upon the enamel of the teeth. I lay particular stress upon cleansing the teeth. I tell my patients that the teeth ought to be cleaned whenever anything accumulates on them. The only danger that results from accumulations around the teeth is not in the pressing of the gum away from them, but previous to that there is a fermentation of matter there, the injurious effects of which cannot be obviated by two or three visits a year to the dentist. The great injury is done by the products of the fermentation of particles of food left upon the teeth after eating. When the teeth are brushed soon after the meal is over, there is nothing on them of a hard nature; nothing firmly attached, or that requires any amount of friction to remove; it is loose, and if the brush can reach it, if the bristles are so arranged that the accumulations can come within their grasp, a simple movement of the brush will remove them from the teeth with little or no friction. The greatest difficulty is in reaching the approximal surfaces of the teeth, and especially around the posterior molars, with the ordinary brush. Those of the profession who have adopted the brush which I introduced believe it more readily penetrates the interstices of the teeth, and reaches the places where brushing is most needed, than any other style of brush. It is so tapered at the end that it reaches around the last molars. With the ordinary brush, and the average-sized mouth, the back of the mouth cannot be reached, especially by persons who do not know much about dentistry. They must have a brush that will readily reach those places, or the teeth will not be properly cleansed. I instruct my patients to brush their teeth at night before retiring; and in case there is an acidity of the mouth, I advise them to use an alkaline powder. I have two kinds of powder, both of which contain a considerable amount of carbonate of soda. I think they are admirable preparations to use before retiring. Where there is any soft deposition under the gum, and the gum is not firmly attached, I think it is best to brush from the gums and the necks of the teeth towards the cutting edges. That seems to stimulate the gums and facilitate their attachment to the teeth, rather than to hinder it, and brings out the very best results.

All the gentlemen who have spoken to-night have confined their remarks to the cleansing of the natural teeth. There is a great point in this connection that has been almost entirely ignored by the profession, and that is to instruct and enable their patients, who have artificial dentures with deep depressions, how to clean them

properly. They have nothing at all that will reach and cleanse these places in a moveable denture. We have all seen the evil results of this in patients who have come to our offices wearing artificial plates that are very filthy to say the least. I would like to present to the society a brush that is designed for cleansing artificial dentures, and which will, I think, serve that purpose very satisfactorily.

Dr. W. H. Atkinson. Mr. President, there is a false estimate of professional men in the community. Patients do not know what they need, and they either give professional men too much or too little confidence. If we may judge of the amount of knowledge extant upon the subject of keeping the teeth in good order by the remarks and the writings that are common in the profession, the list of men who comprehend the subject at all would necessarily be very small, even though they may be dealing with it every day. It has been one of the most painful observations of my life that the men who put in beautiful fillings would send their patients away with a bill of health, and with rings of calcareous deposit around every tooth in the mouth. I have seen that not once or twice, but innumerable times, where the mouths have been pronounced to be in a healthy condition. But there is one man in the profession whom I have never known to let a patient pass from his hands in that condition; and as he is not here to-night I may name him; I refer to Dr. E. A. Bogue. He tells people that cleanliness is really their safety, and he acts it out. I have seen others who approach it, but I know of no one who in that matter is on an equality with him. Where is the anatomist or the pathologist who speaks about calculous deposits pressing upon the gum, and thereby causing its absorption? There must be a cavity or recess in which the magma of lime can first be deposited and retained before crystallization can take place and the deposit become solidified. The dental ligament must first be injured, and a retrograde metamorphosis or derangement of functional action ensue, so as to leave it hanging loose and forming pockets, before there can be any formation of lime around the necks of the teeth.

Look at those teeth that were presented this evening by Dr. Francis. There evidently was not the first effort made towards cleaning those teeth. You can see clearly enough that there were great pockets around them in which deposits were formed which reached out over a considerable portion of the gum in its deteriorated condition. Always clean the teeth if they need cleaning. Where do they need cleaning? Where they are dirty. Where are they dirty? Never on the rotund surfaces. The lips and tongue will keep those surfaces sufficiently clean. You can hardly injure the teeth by brushing if you use no powder and brush them lengthwise, not

crosswise. Always brush the lower teeth up and the upper ones down, thus coaxing the delicate festoons of the gums to fit nicely around their necks, so that they shall lie flat and beautifully over the enamel, as the epithelium lies over the finger nails. If you tear the latter you get hang-nails, and if you tear the gums you get pockets under them. In the worst cases of pyorrhea alveolaris I have ever seen there was neither salivary nor sanguinary deposit, nor any deposit at all. I have seen many cases where such deposits were very rapidly laid down; but then it is soft, and a little rational brushing will take it away. We should teach our patients how to brush their teeth, and warn them against over-brushing. Some of the finest cultured people are apt to cut into the necks of the teeth on the right side by brushing backward and forward instead of up and down. I had one patient, a minister from Canada, who had cut into the necks of his teeth by improper brushing so that there was a secondary deposit of dentine, and they began to be tender. On the other side of the mouth the destruction was not so great. He was right-handed. I have never seen teeth that were fairly organized which, if kept clean, would not remain in a good and healthy condition,—never. Wherever you have well-organized teeth and keep them free from foreign matter resting in pockets around them, so that no fermentation can take place, and there is no abnormal expression of function, you will not have decay. I have seen infants' teeth decayed when they cut through the gum. This occurs in the first place from deficiency of power to build up lime-salts. A child may have some disease that interferes with the normal expression of these parts of the system for the time being, and subsequently they succumb to attacks which would not affect well-developed organs; the lime-salts are dissolved, and we have what we call decay. This subject is so vast that it is impossible to treat it with anything like fullness or clearness in a running speech. It really involves the whole field of the histological growth of the teeth. The causes of decay are in the blood.

You will find that a great deal depends upon how people are born and bred. We see whole families who exhibit magnificent teeth, and we say those are typical teeth, while others are miserably organized and they decay. It is not neglect of cleanliness that causes deposits of lime. Where is the proof of that? A patient has a heavy incrustation of lime on the teeth in one side of the mouth, the other side being free from it. One side of the mouth is sick; the other healthy. I can tell by looking at the mouth on which side the trouble is. The sick side is the one which shows the deposit of lime. That is the one that needs cleaning. When there is no tenderness of the teeth, you chew all around the mouth.

Very fine teeth do not need any cleaning, further than nature will accomplish in the process of eating, and by the instinctive action of the tongue and lips. I am astonished to hear Dr. Abbott advocate a brush with the bristles cut straight off. I would just as lief have a stick as to have that kind of a brush. What can you do with it? It can only reach the rotund parts of the teeth. If you brush crosswise, it will spring from one rotund surface to another, and if you brush up and down it is necessarily so stiff that none of the bristles can reach the approximal surfaces. If the bristles are cut different lengths, they will find the inequalities of the teeth, if you do not brush too rapidly; brush gently, and with a slight rotary movement, so as to remove from the depressions and pockets the little deposits of substances that are likely to ferment if allowed to remain there. The "prophylactic" brush is an excellent one to accomplish this object, and I have not recommended any other brush since it was introduced. I have never sold one. I give them to my patients, so that they may be converted to the use of a really good brush. It is the good housekeepers in the mouths of our patients that keep our reputations good, and show that clean teeth means something. I have a lady patient who occasionally has a cavity, and why it comes I do not know. It generally develops across the teeth, between the bicuspids, and about half-way from the point where the enamel knuckles together and the neck of the tooth. Right across the enamel there will be a little pit,—one of those ugly places that look as if they had been drilled out. I do not know why her teeth decay. I think, if we knew all the little circumstances that enable us to keep teeth clean, and knew what cleaning teeth meant, then we would come to an understanding of how to take care of them. The doctor says use floss silk. If I had to be confined to one thing for keeping the teeth clean, either toothpicks, brushes, or anything else, I should choose floss silk.

Dr. Abbott. I take issue with Dr. Atkinson in his statement that a brush with bristles of even length is useless. I have used such brushes myself for thirty years; never allow my patients to use any other kind, and I know from this experience that they accomplish what is required of a tooth-brush in a most satisfactory manner. A brush with bristles of uneven length presents no special advantage; in fact, I think it somewhat detrimental to the proper cleansing of the teeth.

Dr. Clowes. Gentlemen, there is nothing, except doing good professional work on the teeth, that is so important as to have our patients know how to take care of their teeth. If we cannot get the patient to take care of his teeth we are at sea. We have no safety, for, no matter how well we do our work, the teeth will get

out of order and become diseased again. I take as much pains in my practice to teach my patients how to take care of their teeth as in doing my work. I will tell you how it is that patients are not able to take care of their teeth. For instance, a patient comes to me with a number of approximal cavities; I put in a jack-screw, crowd those teeth apart, and fill them. When I am done the teeth are as close together as they were when he came. I ask the patient to brush his teeth and keep them clean. Can he do it? I think not. The condition of things is the same as it was before. If I expect my patient to do his duty by himself, I must put him in a position where he can do it. I find those teeth decayed because they were close together; therefore I separate them in such a way and fill them in such a way that he can brush between them. In the first place, how wonderfully near being right Dr. Abbott was when he said you want a straight surface,—that is, a flat brush. There is no other that deserves the name of brush at all.

I tell my patients that there are three motions in brushing teeth; the first is an up-and-down or perpendicular motion, brushing the gums as well as the teeth, with a moderate pressure, so as to bring the bristles between the teeth where you want them. Then there is another motion that I call the transverse motion, and lastly an undulating motion. I tell the patient that, of all places in the mouth that they must be particular about, these buccal surfaces are the most important; the ugliest decays that we have to deal with appear there, and to prevent that they must allow the brush to go down upon the gum and remove any particles of food that collect there. The brush must go down into that valley of deposit in order to keep the teeth sound. If the brush is held properly it will touch all those places that are to be cleaned, and a brush with a perfectly straight surface will work admirably,—precisely as you want it. Having separated teeth properly, you can brush between them. But there are little points of contact that should be left, forming what I call the approximal arch, where a silk floss of about half the size of the ordinary kind will work beautifully in cleansing those surfaces. Then rinse the mouth with moderately cold water. In those three things you have the most perfect means of taking care of the teeth,—the brush, silk floss, and rinsing the mouth. You having done your duty, and taught your patients how to do theirs by these simple means, the teeth will be permanently saved.

Dr. Jackson. I would like to ask, for the benefit of some of the younger members of the profession, the best method of polishing teeth after they have been scaled?

Dr. Clowes. The best way to polish teeth after they have been scaled is to do nothing at all. If you have cleaned them properly

they are already polished. I have my instruments sharp, and I make the surfaces smooth as I go along. As for polishing powder, I do not use anything of the kind to polish the teeth after doing my work. I put into my patients' hands what I believe to be a proper brush and proper tooth-powder for keeping their teeth in order. I do not do any special polishing.

Dr. Atkinson. If a wall of enamel that has been polished by the action of food is touched by a corundum wheel or any sharp instrument, it needs polishing. A dentist who is not merely a mechanic, but a level-headed man who appreciates the feelings of his patient, will take a soft-rubber disk and precipitated chalk, or, if need be, a little rouge powder, and polish it. If the heat disturbs the patient, apply a little water while you polish. Look at the jewelers and see how they polish; they do not bear heavily upon the polishing wheel, but lightly. In that way you leave a polish on the enamel. If the dentine is exposed it needs the same, because there is more living matter, more living fibrils, and it needs to have the deposit of lime hardened. Where are the advocates of the Arthur method? Do they not polish?

Dr. Clowes. I am talking now about taking tartar off teeth. After that has been done, a brush and tooth-powder in the hands of the patient will do all the polishing that is necessary. I did a great deal of polishing in my younger days, and to very little purpose.

Dr. Jackson. There are very few patients come into my chair whose teeth I do not polish; and some of them as often as once in three months. I use pumice-stone principally, and vulcanite rubber disks,—as hard as I can get of the softer disks, using water with them. Sometimes, in places where the mouth is rather dry, I use glycerine with pulverized pumice-stone; cooling the disk frequently with water. By that means I clean molars that it seems impossible to clean in any other way. You can polish the molars more easily with rubber disks than you can by any other method. It will take off the green stain beautifully when you cannot get it off in any other way. I am opposed to the use of floss silk to any great extent, because I think it is likely to cut and injure the gum. I find that when my patients follow its use persistently the gums become very much separated from the teeth. I think dental fiber is far superior. You can draw it through without any force, and there is no danger of its slipping through suddenly and striking the gum.

Adjourned, subject to the call of the president.

B. C. Nash, D.D.S., *Secretary.*

NEW JERSEY STATE DENTAL SOCIETY.

The following discussion was had on Dr. C. N. Peirce's paper, "A Factor in Tooth-Preservation" (see the Dental Cosmos for September, page 520), read before the New Jersey State Dental Society, at Asbury Park, July 16, 1885:

Dr. Frank Abbott. There is one idea in the remarks of Professor Peirce that I want to notice. As I understand it, all animals, no matter what kind or where they may be, or what they live upon, are formed after a certain type. How that certain type was originated, or when, or where, I am unable to say; but that that type of individual was intended or expected to live upon certain kinds of food, and that appropriate teeth were placed in its mouth, or do grow there, for the purpose of obtaining and preparing the animal's food and furthering digestion, I have not any doubt; and that change of food, or the necessities which bring about such changes, do modify the form of the teeth, as has been so very beautifully illustrated by Professor Peirce, I have not any doubt at all. We know it is so in man. I doubt very much, however, if even in a thousand years, notwithstanding the changes that may take place in the habits of the human race, whether the ordinary type of a set of human teeth will be, as to number, twenty-eight instead of thirty-two. If there is any evidence of such a change at the present time, I can hardly see it myself. I know that some men who claim to be very learned on this question assert very emphatically that the time is fast coming when the wisdom teeth will be no more in the mouths of the human race, and will never appear again. If I were to judge from what some of our older dentists did years ago, and are doing to-day, I should sooner believe that the first teeth to be missed from the typical set would be the sixth-year molars; that they would eventually fail to come into the mouth at all, by reason of the fact that those teeth are extracted more frequently to-day than any other teeth in the mouths of the human family.

With reference to the subject of the preservation of the teeth, which is one of the greatest importance to us, the doctor very correctly says that the exercise of the proper function of the teeth is the greatest natural preservative of those organs. I would go a little further than that,—further than the function of masticating the food,—and say that I believe that that vulgar, unpleasant, disgusting habit of chewing gum has in many instances much to do with keeping the teeth of children from decay. It cleanses the teeth in a manner that nothing else does; even the toughest beefsteak you can find is not half so serviceable in this respect as spruce gum. Tooth-preservation is largely a matter of cleansing, and chewing gum is an operation which cleanses the teeth in the most perfect manner, forc-

ing out of the interstices between the teeth every particle of food or anything that may have a tendency to do harm there.

The doctor referred to a number of ideas or theories in reference to the destruction of the teeth by caries,—among others the septic influence or cause of decay in the teeth. This low organism business has been run almost into the ground. It has been worked over and over in different directions. A German who has recently experimented with sterilized earth has discovered that whatever you plant in earth that has been sterilized remains as dead matter, and will not germinate at all. Pasteur has discovered by numerous experiments that if food that has been sterilized be put into the stomach of an animal it will not be digested. The great comma bacillus, which was lately believed to be the germ of Asiatic cholera, has been shown, it is claimed, not to be the cause of cholera at all. Even Dr. Koch has come to that conclusion. The fact is that it is probable that our coming into life in the first place, as well as our existence after coming into life, is more or less due to the influence of these very organisms that we have been talking about so much as being the cause of disease and destruction; and yet that theory may still be true. But the fact that we cannot digest our food and cannot raise a plant without the assistance of these organisms,—the fact that both vegetable and animal life are dependent upon the action of these little organisms,—is almost startling to us. The opinion has prevailed that we are overrun with millions of different kinds of minute organisms to such an extent that we are liable to be carried off at any moment. Our teeth are being eaten up, so that every time we look in the glass we expect to see a new cavity. It has come to that point that these microscopic organisms are really a bugbear with us. But things are taking a different turn on the other side of the water, and also in New York, where in a certain laboratory similar experiments are being made in a very quiet way, such as have been made by Pasteur in Paris and by Koch in Berlin, with the view of determining this question, if possible, and utilizing any new facts that may come up.

Dr. W. H. Atkinson. I was delighted with the patient and lucid description *in parvo* of all that has been formulated in dental morphology that we have been favored with this morning by Professor Peirce, and I feel like wanting to hold my mind in proper poise, and to pray that we all may have patience and penetration enough to digest some of the food that he has given us, and that we have not quite got the masticatory apparatus to reduce to pabulum. The old saying, that "the inspiration of the Almighty giveth man understanding," has never been more clearly proven than it has been in the history of these investigations that are called scientific. In the

last analysis, every one of them is dependent upon an assumption to start with.

If we would patiently look at the metamorphoses going on by the seashore, or in the marsh pools; if we would pick up a little of what we have called duck's-meat or green frog-spawn, which the scientists call sphagnum, and put it under a microscope and study it as the first step in the class of Rhizopods, we would begin to be able to follow in the line of observation that would give to us a basis of reasoning upon these morphological changes. The changes of structure that we observe in dealing with odontology are the result of the animal's inheritance of the molecular experience of his whole ancestral line. What did the doctor say about the Echinoderm? That the ancestors of the present specimen had originally been covered with spines inside and out, and that by stress of necessity some of those spines had been so modified as to become teeth, and perform the required prehensile and masticatory functions; and so we have developed the wondrous Aristotle's lantern. And for what? The preservation of the ego, the I. That is the biggest business they could be about. How did they do that? By stopping the developing energy at the point that met their demand. It is consciousness being arrested that produces sub-consciousness, the interactions of which produce sentiency, the five modes of which we call the senses. When we have digested that idea we will see the relation an organ bears to its function and how organs are modified.

Dr. Peirce. Professor Abbott mistakes the condition of affairs when he speaks of types of animals being established, and those types having fixed organs and fixed foods. The effort of scientists to classify and arrange into distinct groups or orders has led to continued confusion. The fact is, there is such close relationship existing, and at the same time such a recognized differentiation between animals, that it is difficult to find distinctive features sufficiently highly specialized and reliable to enable the comparative anatomist to say that this is a distinctive type or class without resemblance to any other. The finding of intermediate and transitional characteristics makes it always difficult to arrange or classify animals, and leads to varied results by different anatomists.

As a single illustration,—if our friend, Dr. Abbott, will visit Professor Marsh, of Boston, or J. L. Wortman, of the National Army Medical Museum, he will, I think, be told that the ancestor of the horse was a very different animal from the one he so much enjoys driving,—the toes and the teeth both much changed by virtue of change of habitat and food. Forty-four teeth was the typical number, but now forty and forty-two suffice. Other groups of animals in the same manner have suffered a reduction in the number of both

the incisors and pre-molars; and, reasoning from analogy, we come to the conclusion that man will have in some not far distant future only twenty-eight instead of thirty-two teeth.

With reference to what has been said regarding the sixth-year or first permanent molars, these you know are classed with the permanent teeth; but they are really deciduous, and belong to the temporary set. What are deciduous teeth? Where do they originate? The deciduous incisors and molars are erupted by the twenty-fifth month. The permanent teeth following these are buddings from the inflection of the columnar epithelium that gives birth to the deciduous teeth; they are not original or primitive; they are secondary. The first permanent molar is an original inflection, not a budding. It is developed the same as the deciduous teeth, from an inflection of the columnar epithelium, and not by a budding from another tooth, while the second and third molars are the result of buddings,—the second from the first, and the third from the second. So in this fact we have some reason for anticipating the temporary condition of the sixth-year molar. It belongs really to the deciduous teeth, by virtue of its being an original inflection, and not a budding from a preceding tooth.

If we look at the typical mammalian teeth, we find, taking one side of the upper jaw, three incisors, one cuspid, four pre-molars, and three molars. That gives us forty-four teeth. How many mammalians have to-day the typical number of teeth, forty-four? Our typical dog has forty-four teeth, but the different breeds of domesticated dogs vary greatly in the number of their teeth. They have been quite modified in that respect, owing very likely to specialization in conformity to changed diet. It is very probable, as Dr. Atkinson says, that there is much in this that is yet theory, but we cannot help it. Theory must always go in advance of demonstration, and we must examine and accept the most plausible theory. I did not want Prof. Abbott to go out with the impression that the theory of permanent forms and types was accepted.

Dr. Atkinson. I have a little fatherly feeling towards Dr. Abbott, too, and I do not want him to go out of the room with the idea that mutilation is transferable to the progeny of the mutilated parent.

Dr. Abbott. It is sometimes.

Dr. Atkinson. Never. I also want to take care of my friend Peirce. He tells us that types are not established. I would like to know if he has been to heaven to see what the types are; or whether he means that a type is established after it is approved by the poor groundlings, or whether this matter of budding, which was revealed to us as a process by Goodsir, has not something to do with it. What is budding? It is a demand of consciousness. Does conscious-

ness throw away the organ that is no longer in use? The evidence is that it does not, but that it tends to form buds, whether there is any formation of teeth or not. Even the eels, which have no enamel on their teeth, always have an enamel organ, and if the requirements of the animal should demand the development of enamel it would be evolved. Nothing is thrown away but the needless material, and there is simply a minification of a useless organ.

Dr. Peirce. Here is the skull of a squirrel which shows modification in development. One incisor, having no antagonist to wear it away, has grown to an abnormal length and formed a complete circle. If this accidental modification had proven of advantage to the animal, it might be intensified and reproduced in the offspring, and you would have a variety established that would be quite unlike the original or ancestral type.

Dr. Abbott. That would be a modification of the type.

Dr. Peirce. Yes.

Dr. Atkinson. Not at all. It is simply an extension of the longevity of a tooth that was expected to be worn away, but was not because the opposing tooth was lost.

Dr. Abbott. In reference to the question of type, there is something about the type of the horse that has been spoken of that is very peculiar and very interesting. They claim, as you know, that the original or typical horse was a little animal about a foot long, and had four or five toes on each foot, and that it ran upon these toes as our horse does upon one toe. It was not a carnivorous animal, but was subject to the ravages of carnivorous animals, and had to seek safety by getting out of their way; and the environments of the animal, the necessity of saving its own life, has developed the present type of the horse, having but one big toe, and it is his big-toe nail that we shoe. All the other toes, because they were not used, have dropped away. A little bit of horny growth on the shank opposite the ankle joint remains sometimes as a rudimentary evidence of one of the original toes of the horse. The necessities of the animal have forced it into these changes; not that the type has changed voluntarily at all. It is just so with human beings. Necessity has demanded certain changes, and they have come, and do come. There is no type of mule. There is a typical horse and a typical donkey; but when you mix those types you get a modified product that cannot be carried any further.

Charles A. Meeker, D.D.S., *Secretary.*

MINNESOTA DENTAL SOCIETY.

The Minnesota Dental Society held its second annual meeting in Minneapolis, Minn., commencing July 31, and continuing three days.

The retiring president, Dr. L. W. Lyon, of St. Paul, delivered the annual address.

Dr. Knight, of Minneapolis, read an essay on "Pulpless Teeth." He argued that the mistake oftenest made is in over-treatment. If the surroundings of a tooth are given a fair chance after removing the cause of a disturbance, in a majority of cases it will return to a physiological condition. He summarized the treatment of pulpless teeth in the following rules: First, diagnose the case. Second, select each remedy for a distinct purpose. Third, avoid over-treatment. Fourth, do not spare tooth-substance in gaining free access to the pulp-chamber. Fifth, fill as perfectly as possible each root to its apex.

In the discussion which followed, Dr. Clements said he favored filling immediately after removal of the pulp, or as soon as the blood ceased flowing. He used oxychloride of zinc.

Dr. Avery said he always preferred to wait from two to seven days after removal of the pulp before he filled the canals.

Dr. Knight related one case where, thinking the hemorrhage had ceased, he filled the root, but inflammation ensued, and on removing the filling there was a free flow of blood. After further treatment, the case was made comfortable and satisfactory.

Dr. A. T. Smith always waits several days after the removal of the pulp before filling a root. He favored as free an opening as possible in the root canal.

Dr. Bailey has had poor success in drilling roots, and is bothered most by the anterior roots of the lower molars, and in many cases his results have not been satisfactory. To avoid passing the apex, he gauges his drill with a small piece of rubber-dam on the shank. For filling roots he generally uses gutta-percha cylinders, having first moistened them with chloroform.

Dr. Talbot, of Chicago, was called on, and explained his set of reamers, showing their uses, and how they were often abused through ignorance. He thinks oxychloride of zinc the only proper root filling, owing to its caustic and preservative effects on animal matter; sealing a root tight and more fully preventing formation of gases. The only objection to it is the trouble it causes if forced through the apex.

Dr. Williamson often uses for filling nerve canals a paste of oil of cloves, oxide of zinc, and carbolic acid,—this being hard enough to produce satisfactory results.

Dr. Hale read a paper on "The Minute Anatomy of the Teeth." [This paper did not accompany the report.—Ed.]

Dr. John S. Marshall read a paper entitled "Treatment of Deep-seated Abcesses without External Incision." *

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* See page 590, current number of the Dental Cosmos.

Considerable discussion was had as to the action of peroxide of hydrogen.

Dr. Marshall said that Dr. Harlan's theory of its effect was that the extra atom of oxygen unites with the sulphur, and forms a trace of sulphuric acid, which acts as a slight caustic on the pyogenic membrane, cleansing the sac and decreasing the formation of pus.

Dr. A. T. Bigelow read a paper entitled "The Management of Children in the Dental Chair." This paper treated of the best manner of getting control of little patients, urging gentleness and frankness; the use, when possible, of local anesthetics; well-tempered instruments; frequent brief rests during the operation; the gratification of the child by submitting each instrument to his inspection before using it, and limiting as much as possible the time required for each sitting.

Dr. Weeks thought that parents should be taught that their own peace and their children's welfare would be promoted if they would abstain from reciting their own painful experiences in the dental chair in presence of their children.

Dr. Cruttenden thought that mute children had less dread of dental operations because they did not hear many of these thoughtless remarks.

Dr. Jenison said there were many dentists as well as parents who needed educating in regard to the treatment of children. To regain the confidence of a child who has been once deceived is no easy task.

Dr. Marshall thought that many children, if properly treated, will endure pain better than adults.

Dr. Patrick said that under no circumstances should the coaxing or pleading of parent or patient lead us to do what we feel to be wrong, for but seldom would we be excused for unsatisfactory results.

Dr. Spalding, of St. Louis, said that in some cases it is better not to try to be as thorough with young children's teeth as we might desire in cases where thoroughness would involve protracted suffering. In twenty years he has not extracted a tooth for a child except to allow room, or for regulation, and he thinks it unnecessary and cruel in simple cases of toothache. Eliminate extracting, and you remove much dread from a child's mind, and gain a strong point.

Dr. M. G. Jenison read a paper entitled "Anesthesia," which was discussed by Dr. Reynolds, of Wisconsin, and others.

Dr. J. H. Martindale read a paper on "The Uses of Cocaïne in Dentistry." He claimed that by an injection into the gums of a few minims of the solution of the muriate of cocaïne he is able to effect the extraction of single-rooted teeth, and sometimes of several-rooted teeth, with little or no pain. He renders the introduction of

the needle painless by a previous application to the gum of the oleate of cocaïne. He also uses it hypodermically through the fistulous opening connected with an abscess; in the removal of deep-seated tartar; in the fitting of crowns with bands, and in the application of ligatures. He related a case in which he was enabled to remove a vital nerve from the posterior root of an inferior first molar, by introducing a drop of the oleate of cocaïne, and waiting for five minutes. This was accomplished without causing the patient the slightest pain. He had to confess that as an obtundent of sensitive dentine he was not able to make a favorable report of it.

Dr. Jenison said that his experience with cocaïne had been quite variable, but he had derived the most satisfactory results from it in applying ligatures where cavities extended beneath the gum, and in removing tartar that was far under the gums.

Dr. Marshall has derived much satisfaction from its use in his practice.

Dr. Frank Allport thinks the best results are obtained on mucous, submucous, and raw surfaces.

The annual election of officers was then held. The list was published in our last number.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The second regular meeting of the National Association of Dental Faculties was held at the Sherman House, Chicago, commencing Friday, July 31, 1885.

President C. N. Peirce in the chair.

The following faculties were represented:

Ohio College of Dental Surgery.—Prof. H. A. Smith.

New York College of Dentistry.—Prof. Frank Abbott.

Baltimore College of Dental Surgery.—Professors R. B. Winder and M. Whilldin Foster.

Pennsylvania College of Dental Surgery.—Prof. C. N. Peirce.

University of Pennsylvania, Dental Department.—Professors James Truman and E. T. Darby.

Chicago College of Dental Surgery.—Professors A. W. Harlan and T. W. Brophy.

Dental College of the University of Michigan.—Professors J. Taft and J. A. Watling.

Boston Dental College.—Prof. J. A. Follett.

Philadelphia Dental College.—Prof. S. H. Guilford.

Kansas City Dental College.—Prof. J. D. Patterson.

Dental Department, State University of Iowa.—Professors L. C. Ingersoll, A. O. Hunt, I. P. Wilson, and W. O. Kulp.

Prof. W. H. Morgan, of the Dental Department of Vanderbilt University, was also present, and by invitation took part in the proceedings.

Letters were received indorsing the objects of the association from Prof. F. J. S. Gorgas, of the Dental Department of the University of Maryland, and Prof. W. H. Eames, of Missouri Dental College, the latter pledging the support of his college.

The communication from Prof. Gorgas was, on motion, received and placed on file.

The application of the Missouri Dental College for membership in the association was favorably acted upon, and the secretary was authorized to sign the name of the institution to the constitution as a member.

The following resolutions were adopted:

Resolved, That the colleges of this association will receive into the senior classes only such juniors as hold certificates of having passed a satisfactory examination in the studies of junior year; this certificate to be a pledge to any college to which they may apply that a previous term has been properly spent in the institution whence they come.

The above resolution shall not apply to candidates holding diplomas from reputable medical schools who apply for admission to the senior classes.

Resolved, That applicants for admission to our senior classes from foreign countries shall be required to furnish properly-attested evidence of study, attendance upon lectures, etc., the same as is required of junior students; and they shall also pass the intermediate examination.

Resolved, That the fees of all dental colleges, as far as possible, be uniform.

A resolution was adopted providing that the preliminary examination shall include a written history of the applicant's life, an English composition of at least two hundred words on a subject to be selected by the examiners, and an examination in English grammar, arithmetic, geography, modern history, and government; further examination to be at the discretion of the examiners. A committee, consisting of Professors Taft, Ingersoll, and Harlan, was appointed to prepare a schedule of questions for the preliminary examinations.

A resolution fixing the latest date when students may matriculate and obtain credit for a full course was adopted; also, a form of certificate to be given to students who pass the intermediate examination.

On the recommendation of the Executive Committee additional standing committees were appointed on text-books and on curriculum.

The president appointed as the Committee on Text-books Professors Winder, Guilford, and Hunt; and as the Committee on Curriculum Professors Taft, Brophy, and Ingersoll.

Prof. Hunt, from the Committee on Text-books, read a report, representing the need of a series of dental text-books, each subject, as anatomy, physiology, oral surgery, materia medica, therapeutics, pathology, operative dentistry, prosthesis, metallurgy, chemistry, dental art, and dictionary, to be in a separate volume whenever practicable. The committee recommended that the subjects be allotted to the colleges represented in the association, the preparation of each volume to be in charge of a committee of three, the chairman of the committee to be a member of the faculty to which the subject has been assigned; the publication of the series to be intrusted to a special committee to be appointed for that purpose. The report also provided for revision of the work, for division of the profits, should there be any, and for the ownership of the volumes in case the association dissolved.

The report was discussed at length, and was referred to a committee consisting of one member from each of the colleges represented in the association, with power to act. The committee is as follows:

Baltimore College of Dental Surgery.—R. B. Winder.
New York College of Dentistry.—Frank Abbott.
Dental College of the University of Michigan.—J. Taft.
Boston Dental College.—J. A. Follett.
University of Pennsylvania, Dental Department.—James Truman.
Dental Department, State University of Iowa.—L. C. Ingersoll.
Missouri Dental College.—W. H. Eames.
University of California, Dental Department.—S. W. Dennis.
Kansas City Dental College.—J. D. Patterson.
Philadelphia Dental College.—S. H. Guilford.
Ohio College of Dental Surgery.—H. A. Smith.
Pennsylvania College of Dental Surgery.—C. N. Peirce.
Chicago College of Dental Surgery.—A. W. Harlan.

Professors Wilson, Watling, and Darby were appointed a committee to take into consideration the advisability of having a uniform practice in the furnishing of equipments for clinical work.

The election of officers for the ensuing year resulted as follows: C. N. Peirce, president; R. B. Winder, vice-president; H. A. Smith, secretary; A. W. Harlan, treasurer; Frank Abbott, Jas. Truman, and J. Taft, executive committee.

Professors Abbott, Truman, and Winder were appointed a committee to decide questions which may arise after adjournment before the next meeting of the association.

The resolution providing for biennial sessions was rescinded, and a motion adopted fixing the time for the next meeting for one year hence.

Adjourned.

CONNECTICUT VALLEY DENTAL SOCIETY.

The twenty-second annual meeting of the Connecticut Valley Dental Society will be held at Springfield, Mass., on Thursday and Friday, November 5 and 6, 1885.

The programme as already arranged includes a number of interesting papers and reports, indicating that this will be one of the instructive meetings of the year. A cordial invitation is extended to all dentists to attend.

It is earnestly desired that the blanks which this society sent out last January *be returned at once*, that a report from them may be presented at this meeting.

Geo. A. Maxfield, *Secretary*, Holyoke, Mass.

FIFTH AND SIXTH DISTRICT DENTAL SOCIETIES.

A union meeting of the Fifth and Sixth District Dental Societies of the State of New York will be held in the Supervisors' Room, Binghamton, on Tuesday and Wednesday, October 13 and 14.

All members of the profession are cordially invited to be present.

C. J. Peters, D.D.S.,
Secretary Fifth District Dental Society.
E. D. Downs, D.D.S.,
Secretary Sixth District Dental Society.

OHIO STATE DENTAL SOCIETY.

The first annual meeting of the Ohio State Dental Society (reorganized) will be held in Chillicothe, commencing on the last Wednesday of October, 1885.

J. R. Callahan, *Secretary*, Hillsboro, Ohio.

BIBLIOGRAPHICAL.

Practical and Analytical Chemistry. Being a Complete Course in Chemical Analysis. By Henry Trimble, Ph.G., professor of analytical chemistry in the Philadelphia College of Pharmacy. Illustrated. Octavo, pp. 92 and index. Philadelphia: P. Blakiston, Son & Co., 1855. Price, cloth, $1.50.

This is a work particularly adapted to the needs of the student in analytical chemistry. The first part is devoted to practical instruction in the manufacture of some of the more important gases and a few of the principal salts, by which the student gains a familiarity

with the physical and chemical characters of the substances under consideration, and some useful experience in the handling and setting up of chemical apparatus. This is in the right direction, as too often students undertake a course in chemical analysis before they have gained any experience in practical laboratory manipulations or familiarity with the substances used in the work, and in many instances with disastrous results.

In Part II the student is taught to detect the presence of the various bases of different groups, both singly and in the presence of each other in solution, and next the detection of the principal acids, both inorganic and organic. The final section is devoted to the estimation of percentages of the various substances found by gravimetric and volumetric methods. The subject is presented in a comprehensive way, and graded so that the work is rendered comparatively easy. It is not intended to take the place of larger works on the subject, but is admirably suited to the purpose for which it was written, viz., a practical hand-book and guide for the student in chemical analysis, to be used in connection with more exhaustive works, such as that of Fresenius, where fuller references are required. While there is little that is new in the book excepting the manner of its arrangement, the latter throughout is highly commendable.—E. C. K.

Chemical Problems. By Karl Stammer. Translated from the second German edition, with Explanations and Answers, by W. S. Hoskinson, A.M., Wittenberg College, Springfield, Ohio. 12 mo, 111 pp. Philadelphia: P. Blakiston, Son & Co., 1885. Price, cloth, 75 cents.

This little work is a collection of problems of a character which the practical chemist is constantly required to solve, and, while not exhaustive, the examples given fully cover the ground ordinarily gone over in laboratory work, from the simpler calculations embraced in the preparation of salts and reagents to the more complex ones involved in gravimetric and volumetric analysis, including the calculations for the reduction of gaseous volumes. A systematic solution of the problems given would afford most excellent practice for the advanced student who has become familiar with stoichiometrical laws, a consideration of which the author, strange to say, has seen fit to omit, though it would certainly have been a welcome addition to the work, being a necessary prelude to a proper comprehension of the problems given. A key giving the correct answer to each problem is added at the end of the book. As a handbook for both teacher and student, the work is a valuable acquisition to the literature of chemistry.—E. C. K.

Pamphlets Received.

Voice in Singers. Read before the Ohio State Medical Society, June 4, 1885, by Carl H. Von Klein, A.M., M.D., of Dayton, Ohio. Price 25 cents. Columbus, Ohio: Hann & Adair, printers.

Duty of the State Towards the Medical Profession. An address delivered before the Medical Alumni Association of the University of Michigan, Wednesday, June 24, 1885, by Conrad George, M.D., Ann Arbor, Mich. Reprinted from "The Physician and Surgeon," July, 1885.

Electric Light as an Aid to Diagnosis in Surgery, or Externally Affected Parts. By Addinell Hewson, A.M., M.D., of Philadelphia. Reprinted from Transactions Pennsylvania State Medical Society, 1885.

Recherches sur les Propriétés Physiques et la Constitution Chimique des Dents, sur les Rapports du Coefficient de Resistance, a l'État de Santé, ou de Maladie, avec les Modifications de la Nutrition. Étude de Pathologie Générale. Par le Dr. V. Galippe, chef de laboratoire à la Faculté de Médecine, membre de la Société de Biologie. Paris: Librairie G. Masson, libraire de l'Académie de Médecine.

Note sur le Système Dentaire du Supplicié C...... Par le Dr. V. Galippe, chef de laboratoire à la Faculté de Médecine. (Communication faite a la Société de Biologie.) Paris: A. Parent, imprimeur de la Faculté de Médecine; A. Davy, successeur, 1884.

Observations sur le Système Dentaire des Fuégiens. Par le Dr. Hyades et le Dr. Galippe. (Communication faite a la Société de Biologie.) Extrait du *Journal des Connaissances Médicales.* Paris: A. Parent, imprimeur de la Faculté de Médecine; A. Davy, successeur, 1884.

OBITUARY.

J. P. HOLMES, D.D.S.

Died, at Macon, Georgia, September 2, 1885, of apoplexy, J. P. Holmes, D.D.S., in the forty-third year of his age.

Dr. Holmes was born July 18, 1842, at Spring Ridge, Miss. He was the son of Dr. H. J. Holmes, a prominent physician in Mississippi, who died in 1875; was a graduate of the Ohio College of Dental Surgery, class of 1868; commenced practice in Hazlehurst, Miss., and in 1873 removed to Macon, Georgia. He subsequently united with his brother in the establishment of a dental depot at that place, and commenced the publication of the *Dental Luminary*, a quarterly journal, which is still continued. He was a member of the Southern

Dental Association and the Georgia Dental Society, and held office in each. He was a genial, kind-hearted man, and was highly esteemed. He leaves a wife and one child, a daughter.

WILLIAM A. NEWLAND, D.D.S.

Died, at Buenos Ayres, South America, July 24, 1885, of pericarditis, William A. Newland, D.D.S., in the forty-second year of his age.

Dr. Newland was formerly a resident of Philadelphia, and graduated at the Pennsylvania College of Dental Surgery, class of 1865. He went to South America soon after graduation, and had been for many years practicing his profession in Buenos Ayres, where he accumulated a handsome fortune. He was held in high esteem in that community. He is succeeded in practice by his brother, Dr. Geo. B. Newland.

HINTS AND QUERIES.

In drawing into alignment some outwardly projecting superior incisors, the palatal portion of the gums between those teeth and the plate became greatly swollen, and I have employed ordinary astringents thus far to little purpose. Will some one kindly indicate the line of treatment in such a case?—E. F. W., Napier, New Zealand.

A Filling for Nerve Canals.—For the past year I have been experimenting on filling nerve canals with a mixture of pulverized animal charcoal and a small quantity of iodoform. My method of using it is as follows: Take pulverized animal charcoal, one drachm; iodoform, powdered, five grains; mix them thoroughly. Where a molar with devitalized nerve is to be filled, apply the rubber-dam; prepare the cavity thoroughly; cleanse the pulp cavity and canals, where the canals can readily be cleansed, or are large enough to admit a broach. If desirable, the largest canals may be partly filled at the foramen with tin-foil. Next, introduce enough of the carbo-animalis to completely fill the canals and pulp cavity. Over this fill with oxyphosphate; and lastly with a permanent filling material. The carbon is left perfectly dry in the center of the tooth. Out of about twenty-five molars which I have treated in this way, not one has yet given any trouble to the patient, to my knowledge. Where the tooth is not in a chronic ulcerated condition, and there is no soreness, I perform the entire operation at one sitting. The powder can best be introduced into upper molars by filling a small glass or rubber-tube and using a small stick as a plunger to force the powder up into place. I have never employed this method for "front" teeth, fearing discoloration, though I have not noticed any discoloration in the molars. I should like to have others try this method, and report results.—J. E. Davis, M.S., D.D.S.

Replantation of a Tooth.—On the 25th of January last a lady called at my office and insisted on having an upper lateral incisor extracted. It was badly

ulcerated and causing her very severe suffering. After removing the tooth I proposed replanting. She consented, but owing to the lateness of the hour and the length of time it would require to prepare the tooth for replacement, I could not perform the operation that evening, but made an appointment for the following morning. She was unable to call at the appointed hour, but came in the afternoon, just twenty-four hours from the time the tooth was extracted. In the meantime I had prepared the tooth, excised the diseased parts, and filled the root and two crown cavities with gold. I replaced the tooth, causing considerable pain, secured it in place in the usual manner, and dismissed the patient. I called at her home in the evening and found her suffering great pain; painted the gum with tincture of iodine, and gave her the third of a grain of morphine. She called at the office next morning and reported a good night's rest. The tooth was sore to the touch; gum swollen some, but no pain. Three days after I removed the bandage. There was very little soreness and no swelling.

I did not see the patient again for six months, she having moved to another town. Then the tooth was found to be as solidly in place as any of the other teeth. A physician who was present when she called was unable to tell which of the four incisors had been reimplanted. The color of the tooth remained perfect.—J. R. Rayburn, *Fairbury, Ill.*

Cocaïne Again.—As the undersigned is credited with giving the history of the first case in which cocaïne was used for obtunding sensitive dentine (see Dental Cosmos, December, 1884), it may not be amiss for me to say that I have found the six per cent. aqueous solution a boon to my patients when used to obtund sensibility previous to lancing the gums, extracting teeth, or in placing the rubber-dam or clamp. I have failed to obtain satisfactory results from the oleates, although I have given them an impartial trial. Let me add,—do not expect too quick returns. In waiting for effects, patience will be rewarded. In extracting, use the solution hypodermically, forcing it deeply into the tissues.—W. P. Horton, Jr.

To the Editor of the Dental Cosmos:

Many of your readers will no doubt remember the case of the killing of Josiah Bacon, agent of the Goodyear Rubber Company, by Dr. Chalfant, in San Francisco, April 13, 1879. I inclose the following clipping from the Sacramento *Bee* of a late date:

"Governor Stoneman to-day issued a pardon to Dr. Samuel P. Chalfant, who killed Josiah Bacon, an agent of the Goodyear Rubber Company, in the Baldwin Hotel, San Francisco, several years ago, and who was convicted of murder in the second degree and sentenced to ten years' imprisonment at San Quentin. It will be remembered that shortly after Chalfant was imprisoned a woman named Perkins appeared on the scene and began efforts to secure his release. At one time the doctor escaped from the prison, through plans believed to have been matured by the woman. He was recaptured in Nevada, however, and returned to San Quentin. Mrs. Perkins never abated her efforts to secure his pardon, and how successfully she has labored is shown by the fact that his pardon was petitioned for by the entire jury before whom Chalfant was tried, the judge who sentenced him, the prosecuting attorney, and a large number of the leading citizens of San Francisco. It is understood that Mrs. Perkins will soon become Mrs. Chalfant."

This was not a case of "love's labor lost," for Mrs. Perkins seems to have succeeded admirably. I send this because I know that many, like myself, have wondered what had become of Dr. Chalfant.—J. R. Morgan, *Kokoma, Ind.*, Sept. 7, 1885.

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ORIGINAL COMMUNICATIONS.

STUDIES OF THE PATHOLOGY OF ENAMEL OF HUMAN TEETH, WITH SPECIAL REFERENCE TO THE ETIOLOGY OF CARIES.

BY FRANK ABBOTT, M.D., NEW YORK, N. Y.

(Read before the American Dental Association, at Minneapolis, Minn., August 5, 1885.)

One of the most important questions in dentistry has always been the pathology and etiology of caries. Thoughtful dentists have long agreed that there is a marked difference, not only of individuals, but also of races, in the liability of teeth to decay. Quite recently a prominent dentist of New York directly accused civilization of being the most conspicuous factor in its production. It is an undeniable fact that, with advancing refinement of individuals and nations, decay of teeth is more prevalent. It seems to me, however, that even this recognized fact will not altogether explain the rapidly growing tendency toward this disease under all circumstances. It has many times occurred to me that there must be an anatomical substratum to fully explain the liability to caries in each single individual, aside from the acquired local causes to which caries has usually heretofore been attributed. Unquestionably, there are auxiliary agents in producing or fostering decay of teeth, such as certain kinds of food, more especially sweets, which are too often retained in the fissures always found in the grinding surfaces of certain teeth, upon irregular teeth, uneven surfaces of the enamel, etc. But all these cannot fully explain the fact that the simple change in modes of living should manifest itself in the sudden and rapid destruction of these organs. Strong, healthy individuals, upon being transferred from a country with comparatively simple habits of life into a country of high refinement, may soon become victims of caries of their teeth. Modern Germans and Irish, immigrating to America and enjoying luxuries (similar to those enjoyed by comparatively

civilized old Egyptians, in whose mummies we observe, not without some surprise, a pronounced tendency toward decay of the teeth), soon discover, to their great discomfort, at least, that their teeth are becoming diseased.

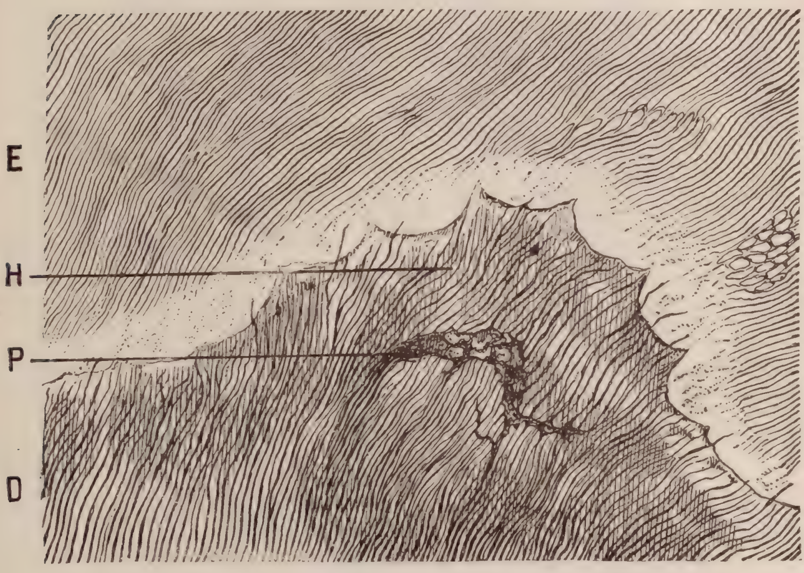
With these questions in mind, I undertook to examine a large number of teeth which had been ground into thin slabs, with the precaution of preserving their soft parts, especially their living matter, a method first introduced into microscopic technique by Dr. C. F. W. Bödecker. The results of my observations, though not exhaustive, are highly satisfactory, inasmuch as they explain, quite positively, the tendency of certain teeth to decay, the cause of which is in direct relation to and dependent upon imperfections in their anatomical structure. I claim, based upon these observations, that certain deficiencies in the minute structure of the enamel must be directly considered as playing a most important part in the etiology of caries.

Before entering upon the description of the anomalies of enamel which I have discovered, I wish to briefly recapitulate the description of the structure of this tissue, and its relation to dentine, as first discovered and published by Bödecker, in his essay entitled "The Distribution of Living Matter in Human Dentine, Cement, and Enamel." (Dental Cosmos, 1878–1879). According to this observer, the enamel is composed of rods and fibers of a slightly wavy course, interlacing between which delicate interstices are left. In these interstices run delicate fibers of living matter, sending minute offshoots in a prevailingly vertical direction into the enamel-rods, thus producing the cross-lines long since known to exist in the enamel-rods, but shown by him to be far more delicate and numerous than ever described before. The square pieces of the enamel-rods are again subdivided into minute fields; they are separated from each other by delicate light interstices, and in all probability contain fibrillæ of living matter. Thus the enamel is raised to the dignity of a living tissue, in place of the former conception of its being a mere calcareous deposit. At the place of junction of the enamel with the dentine a direct connection is often seen between the enamel and dentine fibers. More commonly dentinal fibers run into the enamel varying distances, without a direct union between them and the enamel-fibres; as the latter do not generally reach the surface of the dentine, but terminate above its level, at different heights, while the zone close above their terminations is occupied by a delicate irregular network. In many places the dentinal canaliculi, upon entering the enamel, suddenly become enlarged and form spindle or pear-shaped cavities of varying diameters. They invariably contain protoplasm which is in direct connection with the terminations of

the dentinal fibers, and on their periphery with the fibers of living matter of the enamel. In the teeth of young persons the spindle-shaped enlargements are comparatively larger and more regular than in the teeth of old people. The boundary line between the dentine and enamel is usually slightly wavy and with more or less deep, bay-like excavations, the concavities of which are directed toward the dentine.

I.—Anomalous Relation between Dentine and Enamel.

Fig. I



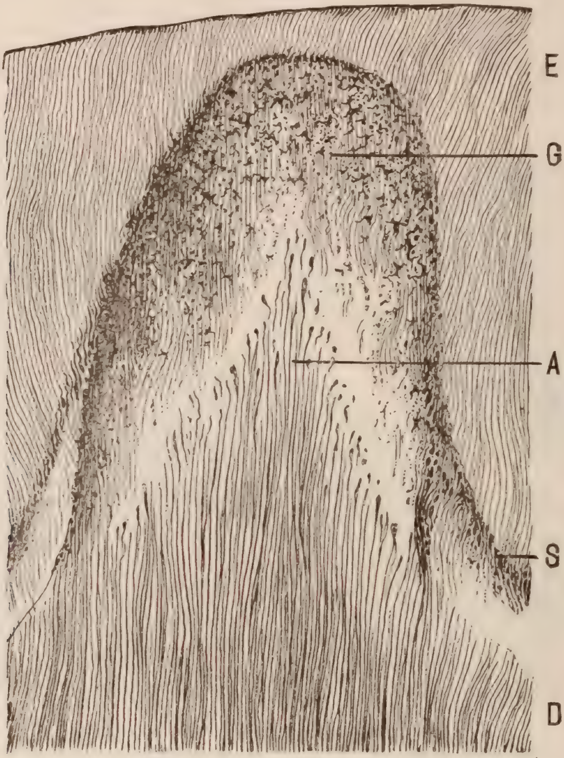
PROTRUSION OF DENTINE INTO ENAMEL.

E, enamel; D, dentine; H, hill of dentine with fluted summit; P, protoplasmic bodies in the dentine. X 400.

In examining a large number of specimens of ground teeth, I met with formations in two instances which are to be considered as rather anomalous, though not strictly pathological. In one instance, that of a temporary molar, there was on the buccal surface a protrusion of dentine into the enamel with a fluted surface, which was produced by a series of bay-like excavations, present also at the junction of the dentine with the enamel in this tooth in general, but not so marked as in this protruding spot. The center of this protrusion is occupied by an eccentric protoplasmic formation, differing in shape from the ordinary interglobular spaces. The dentinal fibers at the periphery are bifurcated in the usual manner, but very few of them penetrate the enamel. The portion of the enamel near-

est to the protrusion is destitute of prisms, while in the immediate vicinity such prisms were traceable almost in contact with the dentine. The zone immediately above the protrusion was but slightly brownish, whereas the prisms of the enamel exhibited a very distinct brown pigmentation.

Fig. 2



PROTRUSION OF DENTINE INTO PATHOLOGICAL ENAMEL.

E, enamel; D, dentine; G, granular enamel; A, summit of the dentine; S, sloping borders of the granular enamel. X 200.

In a second case, that of a permanent cuspid, also on the buccal surface near the edge, a protrusion of dentine was observed, occupying nearly one-half of the breadth of the enamel. This protrusion was of a conical shape, and without a distinct boundary, but blended with an oblong field of enamel of quite remarkable structure. The dentinal canaliculi exhibited at their peripheral portions numerous bifurcations, and terminated in numerous small pear-shaped enlargements, many of which could be traced in connection with dentinal fibers, whereas the most peripheral ones, owing to their devious course, looked isolated. The adjacent enamel showed but very indistinct rods, the main mass of the enamel being occupied by

brownish globular fields, separated from each other by irregular interstices closely resembling the interglobular spaces of dentine, though of considerably smaller size. The deepest pigmentation and the largest number of such *interprismatic* spaces occurred along the periphery of this anomalous formation, especially toward the outer surface of the enamel. The vicinity of the enamel proper was marked by the presence of slightly pigmented rods, more wavy in their course than normal. Toward the dentine the anomalous formation was sloping, and the line of demarkation between the normal and anomalous enamel exhibited either brown and very wavy prisms or small *interprismatic* spaces, decreasing in diameter the nearer they approached to the dentine. I wish to emphasize and call particular attention to the fact that the dentine of this tooth was nowhere traversed by interglobular spaces; the anomalous construction being confined to the enamel.

II.—Stratification of Enamel.

It is known that dentine, without exhibiting pathological features, is sometimes composed of strata, more or less distinctly marked, slightly deviating from its normal structure, and altogether independent of formations known as secondary dentine. We often meet with similar formations in the enamel. We observe layers varying in width and more or less sharply marked by a straight line, which in longitudinal sections of teeth exhibit concentric layers, the broadest portion always corresponding to the cusps, the narrowest always to the neck, of the tooth.

At the outer periphery of the enamel there may occur strata, which, contrary to the general construction as above described, are broadest toward the neck and narrowest toward the cusp, though never reaching its summit. In transverse sections the enamel shows simply concentric lines, separating from one another layers of greatly varying diameters. With higher powers of the microscope we ascertain the fact that the lines of stratification, as a rule, do not alter the general course of the enamel-prisms,—in other words, a single enamel-prism will show an oblique line of demarkation, corresponding to the general line of stratification, without being altered in its construction or its course. An exception to this rule will occur only at the peripheral portions of enamel, occupied by the tapering ends of the above-described secondary strata, which I would like to term *neck-layers*, in contradistinction to the central *cusp-layers*. The tapering ends of the neck-layers may exhibit enamel-rods, almost parallel with the surface of the enamel, a feature which is never seen at the outer periphery of the cusp-layers, where the enamel-rods are invariably directed more or less vertically to the surface.

Fig. 3

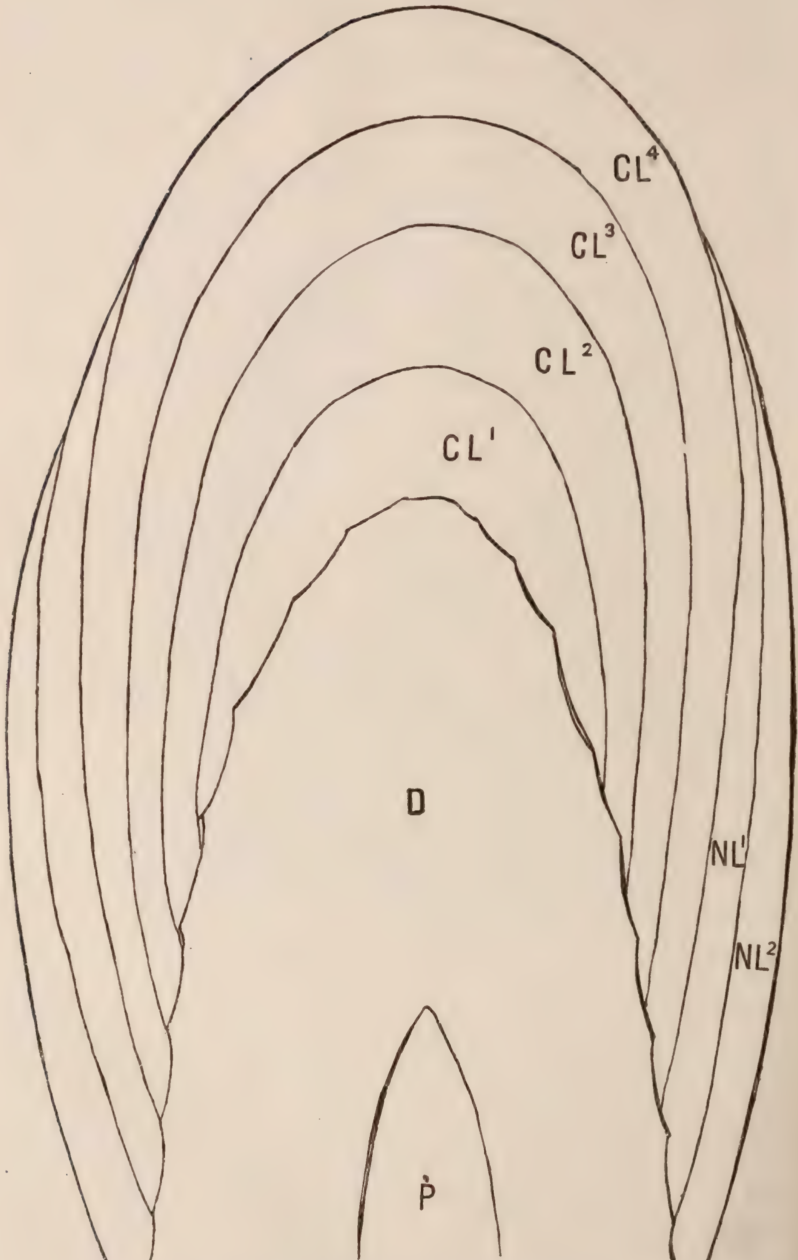


DIAGRAM OF STRATIFICATION OF ENAMEL.

P, pulp-chamber; D, dentine; CL 1, CL 2, CL 3, CL 4, cusp-layers of enamel; NL 1, NL 2, neck-layers of enamel.

The stratification of the enamel is of the utmost importance for the understanding of its pigmentation and granulation. As I will show later on, both the pigmentation and granulation correspond to the general strata of the enamel, thus showing in longitudinal section of teeth a fan-like appearance.

It can scarcely be doubted that the stratification of this tissue is in close relation to the history of its development. We know that the first appearing enamel-cap of temporary teeth, in the seventh month of intra-uterine life, has the configuration of the innermost cusp-layer,—i. e., it is broadest in the direction of the future cusp, and tapers toward the future neck of the tooth. It seems reasonable to assume that the subsequent layers of enamel form on the plan of the first, but there may be a temporary stoppage of its construction, due perhaps to slight ailments of the mother before delivery of the child, or slight ailments of the infant after delivery, which causes interruptions in its organization. Slight ailments of a general nature will not interfere with the final result of an otherwise sound enamel; whereas severe ailments, particularly local, may lead not only to stratification, but to a decidedly pathological condition, which I have before called pigmentation and granulation. These conditions invariably involve a deficient deposition of lime-salts.

III.—Anomalous Arrangements of the Enamel-Rods.

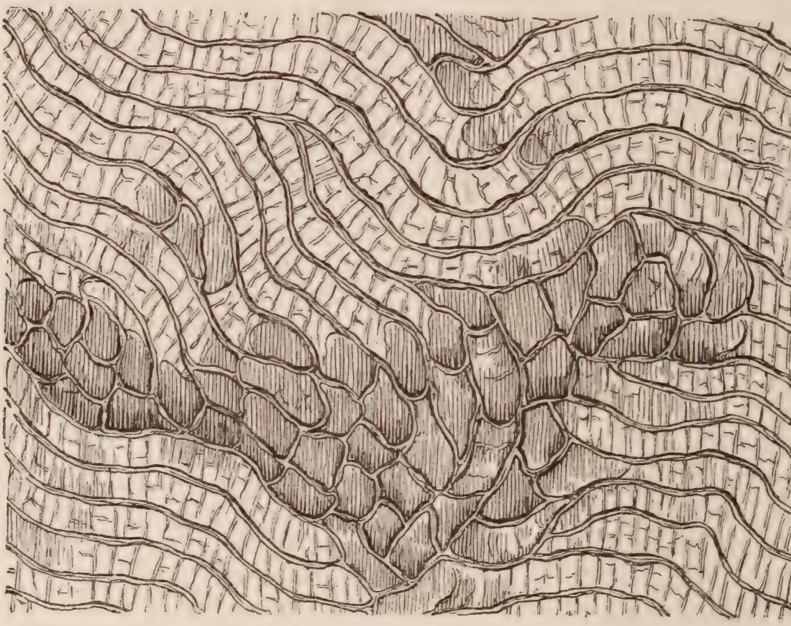
In normal enamel longitudinal sections will, in the majority of cases, exhibit slightly wavy rods, interlaced by comparatively small bundles, cut in a transverse direction. Toward the periphery the curvatures of the rods gradually become less, until when close to the surface they present a nearly straight course. I have never seen transverse sections of enamel-rods directly in contact with the interzonal layer.

Deviations from this rule seem to be rare, and then the enamel-rods seem to lack all regularity in their arrangement. It may occur that close to the interzonal layer the enamel-rods show extensive fields occupied by these transverse sections, which gradually blend with oblique and longitudinal, producing a wavy appearance, to such an extent that beautiful figures arise, reminding one of the grain of *lignum-vitæ*. Still more complicated figures arise if the transverse bars of the longitudinal rods are unusually conspicuous. In such enamel it may occur that the curvatures of the rods remain very marked up to the surface; and consequently groups of transverse sections may be seen directly at the outer surface.

Enamel of this description may be seen only on one portion of the tooth, while the rest is normal. With this curly appearance of the enamel-rods, in all my specimens, pigmentation is combined

as a marked feature, and the interstices between the rods are a trifle wider than normal. Both of the latter features must involve a deficient calcification, and consequently extreme brittleness. It is very difficult to obtain perfect specimens of such enamel. The dentine subjacent to such anomalous formations is freely supplied with interglobular spaces (which is likewise a sign of deficient calcification).

Fig. 4



Extremely irregular course of rods in slightly pigmented enamel. The longitudinal rods deviating to a great extent from the field of the specimen, show oblique and transverse sections. The interstices are widened and contain very conspicuous enamel-fibers. X 800.

IV.—Deficient Calcification of the Enamel without Pigmentation.

The friability alluded to under the previous heading is in some instances very marked,—so much so, in fact, that it is impossible to obtain an unbroken slab of a tooth even with the finest grinding-stones. With low powers of the microscope we observe that the broken ends of the enamel-rods look as if corroded, or as if some of them had been displaced, or torn off by the process of grinding. Neither pigmentation nor an anomalous course of the enamel-rods is necessarily connected with such a condition of the tooth. The most striking feature, however, visible even with low powers, is that the enamel-rods are unusually narrow, the interstices between them unusually wide, and their tenants, the enamel-fibers, very prominent.

The cross-lines of the enamel-rods are likewise considerably widened and irregular, so that the fields of basis-substance look unusually small and irregular. The reticulum in the immediate vicinity of the interzonal layer is also unusually prominent.

Such a condition of the enamel may occur both in temporary and permanent teeth, and may be combined with pigmentation. It is a feature of such deficient enamel that it readily stains with an ammoniacal solution of carmine, something that normal enamel will never do. The subjacent dentine, under such conditions, may either be perfectly developed, as before stated, or be deficient in its formation, as shown by the presence of more or less numerous interglobular spaces.

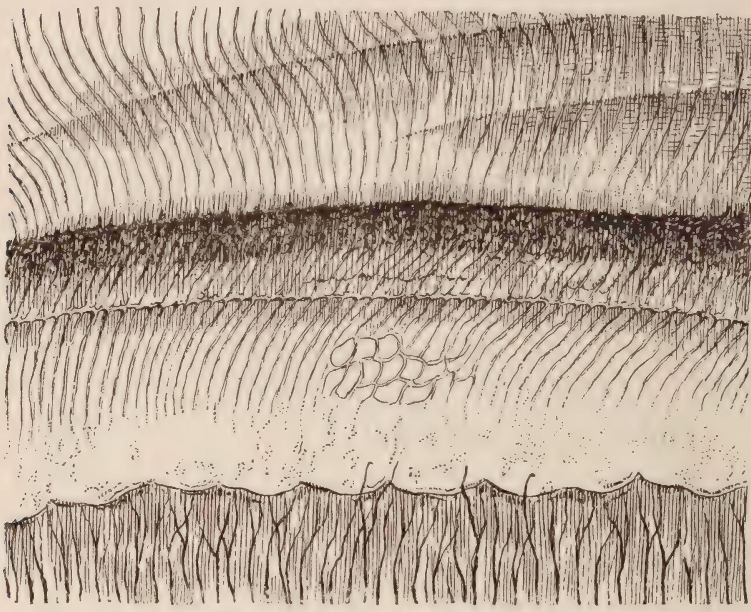
All clinicians have observed congenital white or yellow spots in the enamel of teeth, which if broken into are found to be of the consistence of chalk. Such spots have been termed "white decay," although they do not correspond to the process of caries as we usually understand it. They mean nothing but deficient calcification. Again, all clinicians have seen teeth across which a row of pit-holes exists, where in many instances in the bottom of the depressions no enamel is to be found. This condition is also always congenital, and closely related in its origin to pigmentation and the white or yellow spots. In other instances an originally smooth enamel is mutilated mechanically by the process of mastication, with the result of loss of substance, with abruptly broken, jagged edges. Again, we see teeth with a great portion of their crowns covered by a brownish-yellow substance in place of enamel, which is so soft as to be easily removed, leaving the dentine bare of its covering and extremely sensitive to the touch of an instrument, the pressure of food in masticating, etc. These conditions, again, are, in most instances at least, connected with pigmentation and the white or yellow spots. We might call them exaggerated cases of the same condition. Obviously these congenital defects are dependent upon deficient deposition of lime-salts in the basis-substance, rendering the enamel less resistant and more friable.

V.—Pigmentation of Enamel.

One of the most common pathological conditions of the enamel is its pigmentation. Sometimes it is so slightly marked that the naked eye discovers only a slight yellow-brown discoloration; in other instances it is quite prominent and readily discernible. Specimens of such teeth under the microscope will correspondingly exhibit either a dim yellow tint in the enamel or a very marked brown discoloration. The pigmentation may occur either in non-stratified or in stratified enamel. In the first instance there is no demarkation

of the brown spot toward the colorless enamel; only faintly-marked offshoots of the main spot, tapering toward the dentine, and running in an oblique direction, will indicate the fact that pigmentation has occurred during its formation. In the second instance, on the contrary, if pigmentation invades stratified enamel, there is a close relationship between the two, inasmuch as the deepest stain invariably corresponds to the boundary line of the strata, tapering toward the neck, and gradually fading toward the proximal end of each stratum. Thus, in longitudinal sections, a beautiful fan-like configuration is produced.

Fig. 5



PIGMENTED AND GRANULAR ENAMEL.

D, dentine; ER, layer of slightly pigmented rods broken off; EG, layer of highly pigmented and granular enamel; EP, stratified pigmented enamel. X 400.

The pigmentation may invade all layers of the enamel, often being more marked in its deeper than in its superficial portions. Higher powers of the microscope reveal the following facts: First, that the brown discoloration concerns the basis-substance of the enamel-rods only. Secondly, that the interstices between the pigmented enamel-rods are widened,—not due to the contrast in color, but to a deficiency in the formation of the basis-substance. Thirdly, that the transverse lines of the enamel-prisms are likewise (at least in many instances) enlarged. Fourthly, that the enamel-fibers and their lateral offshoots are more conspicuous than in normal enamel, and more so even than

in the enamel of temporary teeth, and in many places distinctly beaded. Pigmented portions of the enamel are very prone to take up a red stain on being treated with an ammoniacal carmine solution.

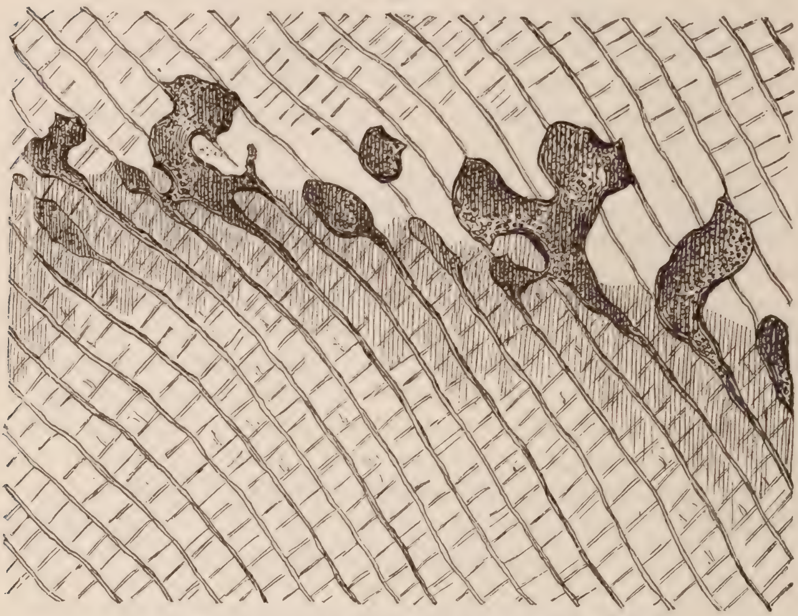
As to the origin of the brown discoloration, I have to say, as a suggestion simply, that at the time of the formation of this tissue there must have been a disturbance in the enamel organ which interfered with the proper construction of the basis-substance and the deposition of lime-salts. What this disturbance really is I am unable to say. All pigments of the body depend upon and are closely related to the coloring-matter of the blood. I am loath, however, at this time, to attribute pigmentation of enamel to the extravasation of blood-corpuscles or diffusion of the coloring-matter of the blood. Careful studies in the history of the development of this tissue must be made before an attempt at a solution of this question will be admissible. One point I am positive about, however, is that this pigmentation is congenital, invading temporary as well as permanent teeth. Acquired pigmentation of enamel seems to be of comparatively rare occurrence, except as a result of caries. I have seen pigmentations of its surface, of a deep orange color, not penetrating the enamel-tissue in the least. Caries on the surface often causes an orange discoloration, diffused and fading toward the normal portions. Several of my specimens plainly show an invasion of the enamel by caries, on spots pigmented congenitally; secondarily, an orange diffused discoloration has taken place, which is likewise prone to take up the carmine stain; thus beautiful shadings of brown, orange, and red are to be seen, the brown being congenital, the orange acquired, and the red artificial. What chemical may lead to an acquired pigmentation or discoloration of the enamel I cannot say.

VI.—Granulation of Enamel.

Under this heading I propose to describe a very peculiar pathological condition of this tissue, which, so far as my specimens indicate, is by no means rare. It consists of pear, spindle, and club-shaped spaces in the middle of the substance of the enamel. Such spaces were known to exist heretofore at the junction of the dentine and enamel only. They may appear in pigmented and invariably do in stratified enamel; the stratification in the latter instances being due to their presence. Club-shaped spaces may appear at the distal boundary of one of the cusp-layers, or there may be several rows of such spaces, varying in extent and degree, but it sometimes occurs that only the outermost cusp or neck layers, are freely supplied with them, whereas the rest of the enamel is normal or more or less pigmented.

Higher powers of the microscope demonstrate that the spaces are enlargements of the interstices between the prisms and the tenants of the interstices. The enamel-fibers are in direct connection with the contents of the spaces,—i. e., with living matter. The spaces, at their stem-like beginnings, run accordingly parallel with the interstices; but in their broader portions may cross the enamel-prisms in different directions. If they are few in number they may protrude from the boundary line of a cusp-layer, and penetrate the adjacent cusp-layer obliquely to the main direction of the enamel-rods. In this instance I could trace the connections of the enamel-

Fig. 6



INTER-GRANULAR AND SLIGHTLY PIGMENTED ENAMEL.

Club, spindle, pear-shaped, and irregular spaces at the boundary of a cusp-layer in the middle of enamel. X 800.

fibers even with the club-shaped ends projecting into the neighboring cusp-layer. If these spaces are present in large numbers the enamel, with lower powers of the microscope, will look dark and granular; hence the name "granulation of enamel," which I have given it.

Fig. 2 represents this condition of granulated enamel with a low power.

Fig. 6 shows the condition under a high power.

In stratified and granular enamel, single strata may be produced

by an interruption of the pigmented enamel-rods, by convex ends directed toward the adjacent peripheral cusp-layer. (See Fig. 5.)

The *interprismatic* spaces of the enamel bear some resemblance to the interglobular spaces of the dentine. I have seen both conditions in a highly-marked degree present in one of my specimens. Whenever these *interprismatic* spaces are present along the border of a cusp-layer they considerably lessen the degree of consistence of the enamel, which upon being ground easily breaks off along the dark granular line.

The nature of the *interprismatic* spaces is plain enough. They mean an incomplete formation of the enamel, owing to some deficiency of function in the enamel-organ during its formation. Obviously not only the basis-substance is deficient, but also the amount of lime-salts is considerably less than normal; hence its brittleness and proneness to decay.

Under the foregoing headings I have described a number of pathological conditions of the enamel, which, at least, so far as stratification, pigmentation, and granulation are concerned, mean a deficient formation of the basis-substance, together with decreased deposition of lime-salts. These conditions are, in my judgment, of the utmost importance in the etiology of caries. Ailments either of the mother during gestation or of the infant in the earliest periods of life obviously cause such anomalies in this tissue. These ailments are known to occur far more frequently in refined people, debilitated, as it were, by civilization, than in strong, hard-working, plain-living people, continually engaged in a struggle for life. Thus, I have directly demonstrated and anatomically shown, in a measure, at least, the reasons why refined people are far more subject to caries of the teeth than people lacking such refinement.

As to the literature upon the subject of pathology of the enamel, I have nothing to say, since, to my knowledge at least, none exists.

THE ALVEOLO-DENTAL MEMBRANE: UNITY OR DUALITY—WHICH?

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(Read before the American Dental Association, at Minneapolis, Minn., August 5, 1885.)

The tissue named as the subject of this paper commends itself to the thoughtful consideration of the dental profession by higher claims than any other tissue of the formed tooth. There is no health, comfort, usefulness, or safety to the dental organism except this membrane be preserved in health, vigor, and entirety. For the last quarter of a century the attention of the profession has been

almost wholly absorbed in the preservation of the enamel and dentine by various methods of filling, and of the pulp by various methods of therapeutical treatment and capping.

Let the entire tooth-crown be wasted by the ravages of decay, and let the pulp die, if but a vigorous root-membrane remains, on the root may be built up a crown the most complete of anything artificially supplied in the human mouth. On the other hand, though the natural crown be perfect, and the pulp still performing its functions, if the alveolo-dental membrane fails the whole structure is gone.

Recently more attention has been given to the diseases of this membrane as manifest in alveolar abscess, superficial and deep-seated ulceration, and in *peripyema*, or, as in modern days it has been called, pyorrhea alveolaris. While close and careful study has been given to and much has been written upon these diseases, the histology of the tissue involved has scarcely been named or thought of.

In looking over the pages of the Dental Cosmos for the whole period of its publication, I do not find a single article referring to the peculiar structure of the peridental membrane except one penned by myself, eleven years ago, entitled "A Plea for the Peridental Membrane." It was written with the hope that some one, more competent with the microscope than I, would enter this field of investigation and give to the profession the results. But no one has seemed to take the bait held out, or to have any relish for the digestion of the very limited number of facts now revealed, as a basis for more extended research. The subject is surrounded with difficulties. Authors of dental works have universally ignored it as belonging to the dental tissues. Not one of our standard authors has ever named more than four as constituting the group of the dental tissues,—viz., enamel, dentine, cementum, and pulp,—three hard and one soft tissue. In studying the anatomy and physiology of these four tissues, years of time have been spent and hundreds of pages have been written. This work has been deemed essential to the right understanding of their diseases. But as no author has ever seen fit to even name the alveolo-dental membrane as belonging to the family of the dental tissues, it has been given but a passing notice, and its diseases have been treated of without special reference to its structure or peculiar relations to the contiguous tissues.

It is not my purpose in this paper to enter into any extended discussion of its peculiar structure, but rather to pick up the fragments of our literature on the subject; then to draw some conclusions as a starting-point for future investigations.

The first question to be decided is, Does it belong to the dental tissues?

To understand its nature and relations, reference must be made to the *dental follicle*, in which all tooth-tissues have their origin and begin to assume their appropriate functions and relations to each other and to surrounding tissues.

Let us call to mind the mucous membrane with its two distinguishing layers, the *epidermis* and the *dermis*, with the membranous line of division between the two known as the *basement membrane*. In the outer layer—the epidermis—the enamel has its origin. In the inner layer—the dermis—the dentine and all the remaining tooth-tissues have their origin.

We are accustomed to divide the fully-formed tooth, for anatomical purposes, into three distinct parts,—the *crown*, exposed to view in the mouth; the *root*, concealed from view by being covered with the gum and the alveolar processes; while that portion covered neither by the enamel nor the alveolar bone, but serving for the attachment of soft tissues to the root, we distinguish as the *neck*, the same corresponding also to the neck of the follicle. It is this *neck*, common both to the follicle and the tooth, to which I wish to call special attention. This will be our starting-point in the investigation as to the proper classification of the tissue lying between the root of the tooth and the alveolar wall.

The early anatomists, regarding the teeth simply as bones, classed the membrane covering the *roots* of the teeth in common with the contiguous bone as belonging to the osseous system; hence they called it the *alveolar periosteum*. Not willing to ignore the teeth entirely as a part of the skeleton, when speaking of the teeth and their surroundings they called the same membrane the *dental* periosteum. In either case the use of the word *periosteum* indicated that they understood that it held its chief relationship to the bone structure, like all periosteal tissue, and they had no distinctions to make between periostea of different bones. If it belongs to the osseous system, it should be born with that system. If it belongs to the dental structure, it should be born in the dental follicle, and connate with the other dental tissues.

Of the three parts of the tooth named, the crown is the first in the order of development. The next development is the neck, which is now at the base of the dental follicle, where the follicle itself has its vital connection with the sub-dermal tissue, whence it derives its nerve and vascular supplies. This follicular neck, which is the constricted portion of the follicular wall, and marks the base of the dentine germ or papilla, which becomes the pulp of the future tooth, is a point of peculiar interest. Legros and Magitot say—and it was noticed by Robin and Magitot (1861)—that "for a long time before the formation of the first dentine cap there appears

between the follicular wall and the organs within it a new tissue, very distinct from the neighboring parts—in color, consistence, and in composition. This is the organ upon which will subsequently depend the formation of the cement." In harmony with this account of the origin of the peridental membrane, we find in Tomes's "Dental Anatomy" (page 102) the following: "It should be borne in mind that the tooth-pulp and the tissue which becomes the root-membrane have sprung from the same source." This is all I have been able to find in our dental literature, or elsewhere, concerning the origin of the peridental membrane. As there are no conflicting opinions on the subject, and if the fact stated above shall be demonstrated (as Magitot thinks he shall be able to do), we must for the present take it for granted that it originates in the dental follicle, and has an equal claim with other tissues originating there. No one has any doubt that the pulp is one of the dental tissues, it being the formative organ of the dentine. By parity of reasoning, we should have no doubt of the peridental membrane belonging to the group of the dental tissues, it being the formative organ of the cementum.

We find now at the neck, common both to the follicle and the forming tooth, a cluster of encircling tissues,—the follicular wall proceeding upward and covering the crown of the forming tooth, the germinating cells of the root-membrane developing downward with the progress of the developing root, and outside of these a layer of osteoblast cells for the construction of bone to support the growing tooth. In other words, the alveolar walls develop simultaneously with the root of the tooth, though alternating as to the exact periods of time when the increment of lime-salts in each may be observed. Every illustration in our books showing this developmental stage of the tooth-formation shows also the development of the contiguous bone,—especially seen in the excellent illustrations furnished by Dr. G. V. Black for Dean's translation of Legros and Magitot's "Dental Follicle."

Just here let it be particularly observed that proceeding out from the base of the dental follicle is a line of cells encircling the neck of the tooth, destined to become the formative organ of the cementum, and immediately contiguous there is another encircling line of cells, originating in the surrounding embryonic bone, and destined to become the formative organ of the alveolar walls and the whole ridge of bone known as the alveolar ridge. For this purpose the osteoblast layer of cells develops downward to form the socket, while the cementoblast is also developing downward to form the cementum; and these two developments are contiguous to each other.

Having thus brought to your notice the different parts of the forming tooth at its neck development, their relations to each other and to contiguous tissue-formations, we are brought to the main question at issue in this discussion, namely, Is the tissue now forming at the neck of the tooth, and destined to occupy the space between the cementum of the root on the one hand and the alveolar wall on the other, *one membrane?* Is the tissue now known as the dental periosteum, and also as the alveolar periosteum, a single or a double membrane? Has it unity, or duality, in its structure and relations?

It has been so generally conceded that the membrane lying between the root of a tooth and its alveolar walls is a single membrane, that the repetition of the statement of its oneness by a succession of authors for the last half century has called forth no dispute. Occasionally a writer has ventured an opinion that it existed as a double membrane; but the opinion expressed has elicited no discussion or systematic investigation. Less has been written concerning the peridental membrane than concerning any other of the dental tissues.

Fifty years ago the dental membrane, as it was called, was said to exist in three parts, or as three distinct membranes,—one forming a lining of the pulp-cavity and the root-canal, another covering the root externally, and still a third covering the walls of the alveolus. When the mistake was discovered as to the lining of the pulp-chamber, there being no membrane found there other than the odontoblast layer of pulp-cells, the conclusion was hasty and definite that the portion external to the root lying between the cementum and the parietes of the alveolus was but a single membrane. The early anatomists are wholly silent concerning its structure. Later writers have voiced the general sentiment in few words, that it is a connective-tissue membrane, of fibrous structure, intermingled with cells, the bundles of fibers passing in an oblique direction *entirely across* from the cementum on the one side to the bone on the other, and well supplied with blood-vessels and nerves. The common sentiment on this subject has been given the greatest prominence and boldness of statement by Charles S. Tomes, in his "Dental Anatomy" (page 101). He says: "A mere inspection of the connective-tissue bundles, as seen in a transverse section of a decalcified tooth in its socket, will suffice to demonstrate that there is but a single membrane, and that no such thing as a membrane proper to the root and another proper to the alveolus can be distinguished; and the study of its development alike proves that the soft tissue investing the root and that lining the socket are one and the same thing; that there is but one membrane, namely, the alveolo-

dental periosteum." Although Mr. Tomes speaks with the greatest positiveness concerning its oneness and identity of parts, the varying terms by which it has been named show a great indefiniteness in the minds of writers as to its nature and relations; and the fewness of those who have expressed a definite opinion, and the little that has been written upon it, give evidence of the extreme difficulty of making sections which will give satisfactory opportunity for study. Kölliker, in his extensive work of eight hundred pages on "Histology," has thirty-three pages on the human teeth, with only *four lines* of the whole on the structure of the root membrane. When you attempt the study of it by reference to authors, you will find how shy all have been of discussing its origin and relations, though writing extensively concerning its diseases.

Yet, as we shall see, our literature, while teaching the oneness of this membrane, gives us such descriptions of its structure, its origin, and functions as to create in the mind a doubt of its oneness, and some writers venture an opinion favorable to its dual existence. The fact that it has so uniformly been called periosteum naturally leads us to inquire into the structure of periosteum. Kölliker says: "The periosteum is not everywhere constituted alike. Where mucous membrane rests upon bone the periosteum is, in most cases, very intimately united to it, so that the two cannot be separated, but constitute a single membrane, as in the alveolar processes. With respect to the intimate structure of the periosteum, it will be found to present almost universally *two layers*, which, although closely connected, differ more or less distinctly in their structure. The periosteum of the alveolus is very intimately connected with the fangs of the tooth, and has the same structure as any other periosteum." This much, then, Kölliker says,—that the alveolar processes at their margins are only covered with the mucous membrane without any underlying gum-tissue, and have a periosteum existing in a single layer; but that the periosteum dipping down from the margin into the alveolus exists in two layers like any other periosteum. We may with propriety ask, Where does it get its other layer? Gray makes the same statement concerning the periosteum in general, that it exists in two layers; then quotes approvingly the language of Kölliker concerning the structure of these two layers. So far as I can learn, anatomists agree as to the structure of periosteum in general, that it exists in two distinct layers. If, therefore, the alveolo-dental membrane is a true periosteum, as all the earlier writers regarded it, we shall expect to find it existing in two layers. While analogy leads us to expect it, demonstration proves it. When a tooth is extracted from its socket the root is found covered with a membrane of soft tissue; and when the alveolus is examined the

walls are also found to be covered with a membrane, which not only proves the duality of the root membrane, but that one may, by violence, be separated from the other. This can most distinctly be observed by the unaided eye in cases of chronic inflammation of this membrane.

The fact that after the extraction of a tooth a membrane is left lining the alveolar walls is plainly evident from the additional fact that a case of necrosis arising from simple extraction without fracture of the bone is never known; whereas, if the periosteal covering of the bone was removed with the tooth, cases of necrosis and exfoliation of the socket would be common and almost inevitable.

If, now, the root membrane exists in two distinct layers or parts, have the two parts the same origin? Kölliker says that the periosteum covering the alveolar processes has but a single layer,—that this is exceptional with regard to periosteum. It is favorable, however, to the idea of a double membrane between the root and the alveolar walls. For it is almost uniformly stated by writers that the lining of the socket of the tooth is but a continuation of the membrane covering the alveolar processes externally, and that the shell of bone forming the socket does not differ from the corticular portion of bone forming the processes. This being the case, the origin of the alveolar lining must be referred to the osseous system, and its function is to form the bony walls of the alveolus. On the other hand, Legros and Magitot speak of the origin of *another* membrane at the base of the dental follicle, between the follicular wall and the organs within it, and very distinct from the neighboring parts, which becomes the formative organ of the cementum. Will any one pretend that the authors intended to include the organ that forms the alveolar walls; that the membranous organ born within the dental follicle, and by its origin declaring itself to belong to the family of the dental tissues, becomes the organ that forms the alveolar processes, which belong distinctively to the osseous system? Is it not much more rational to suppose that the bony socket is built up by a periosteum of its own, like the other compact corticular bone of the alveolar processes?

We now find two membranes arising from opposite directions, yet lying in immediate contact with each other, which become intimately united. This intimate union of the two does not, however, constitute them one membrane in any such sense that they lose their duality. For the *more* intimate union of the membrane with the cementum does not constitute these two tissues one; nor does the like intimate union of the periosteal membrane with the bone constitute both one. They are still distinct and separable.

Having found two membranes or layers, of different origin, yet

performing a similar work, in harmony with each other, let us next inquire as to the structure of these two layers. Kölliker's statement is that the dental periosteum does not differ from periosteum generally, and for this reason he writes but four lines concerning it; considering that he has sufficiently treated of its structure in connection with the osseous system. Of the periosteum he says: "The outer layer is composed chiefly of connective-tissue, with occasional fat cells, and is the principal seat of the true periosteal vessels and nerves; whilst in the inner layer elastic fibers, commonly of the finer sort, constitute continuous and often very thick networks." Tomes, in writing of the alveolo-dental membrane (page 101), says: "At that part which is nearest to the bone the fibers are grouped together in conspicuous bundles; on its inner aspect, where it becomes continuous with the cementum, it consists of a fine network of interlacing bands, many of which lose themselves in the surface of the cementum." Again, he says: "Although there is a marked difference in histological character between the extreme parts of the membrane" (i.e., between the part next to the bone and the part next to the cementum), "yet the markedly fibrous elements of the outer blend and pass insensibly into the fine network of the inner part, and there is no break of continuity whatever." The chief difference, therefore, between Kölliker's description of the periosteum and Charles S. Tomes's description of the root membrane is, that what the former calls "layers" the latter calls "parts." Wedl says but little concerning its structure, but intimates that he considers it a continuation of the periosteum of the alveolar processes. He says: "The root membrane is a delicate connective-tissue membrane, containing an abundance of vessels and nerves; it is intimately connected with the submucous layer of the gums and with the periosteum of the alveolar processes, and covers the root of the corresponding tooth." He then quotes Magitot, in the following words, "The root membrane consists of two portions: an inner, which does not admit of being teased into fibrils; and an outer, which has the appearance of a fibrous structure." Spence Bate, a distinguished physiologist of England, says that "two distinct structures may be traced in the tissue which connects the root of a tooth with the walls of the socket, viz., the peridentium of the tooth and the periosteum of the bone." The former he regards as a dermal tissue; the latter as belonging to the internal or osseous system. He then says further: "However closely in juxtaposition the two may approximate, they still hold their relative connections widely apart. The cementum is the production of the inner surface of the peridentium, and is no way connected with or dependent upon the periosteum of the socket." Concerning this view of Spence Bate, John Tomes, in his

"Dental Surgery" (page 505), remarks: "Although the presence of the two membranes may be assumed to exist, it would, I think, be extremely difficult to demonstrate them individually."

Now let us return for a moment to the statement of Mr. Charles S. Tomes, author of "Dental Anatomy," who gives such positive utterance to the statement of authors generally on this subject, that the fibers constituting in large degree the alveolo-dental membrane "run across from the alveolus to the cementum, without break of continuity." This is the chief fact, or *supposed* fact, on which the teachings of the oneness of the membrane depend. But mark Mr. Tomes's words. He says: "The fibrous elements of the outer part blend and pass insensibly into the bands and fine network of the inner part." He confesses that he has never been able to trace the fibers through from side to side; hence says that they pass "insensibly." *Insensibly* means in a manner that cannot be discerned by the senses. If he is not able by sight or touch, or any other bodily sense, to learn that the fibers do pass through from side to side of the membrane without break of continuity, how can he know that they do thus pass through? He says, as before quoted, that there is a marked histological difference between the tissue next to the bone and the tissue next to the cementum, and the most that he is able to say of the union of the fibers entering into the structure of each is that it is an "insensible" union, i.e., that it is not knowable by the senses. It is, therefore, a mere inference.

I recently visited my friend, Dr. Black, and examined his large collection of microscopical sections to see if I could learn anything from that source of the peculiar structure of this membrane. He had found the same difficulty that others have in obtaining a clean-cut section of tooth-bone and membrane with the several parts *in situ*. After presenting some sections which were more or less stretched, marred, and mangled, he exhibited one prepared from a human tooth, with the alveolar wall attached, which seemed perfect in all its parts. I could discover no tearing or displacement of its parts. In this section, under the microscope, the cemental membrane and the osseous membrane appeared of entirely different structure. Beginning my observation on the cementum side, first was seen the fine network in the meshes of which were lodged the cementoblasts, forming a complete line along the surface of the cementum. Then the bundles of fibers composing this delicate reticulum were seen spread out into flattened bands, lying side by side and nearly parallel with each other; as if you should take several threads of dental floss-silk and tie a knot in the end of each to represent the cementoblasts; then, placing the knots irregularly together, should spread out the delicate fibers of the free ends of

the floss-silk into a continuous flat band. In the specimen these fibers pursued a very oblique and slightly curved course toward the bone. Tracing them to near the middle line of the whole tissue, the obliquity of the fibers was changed by a curvature into a line parallel with the line of the cementum, and on this line all trace of straight fibers was ended, and all beyond was reticulated, forming large, irregular meshes, bounded by conspicuous bundles of fibers, and appearing of a much coarser make than the very fine and delicate reticulum before mentioned as lying next to the cementum, and the osteoblasts much larger than cementoblasts. I called Dr. Black's special attention to the fact that we lost sight both of the obliquity and the straightness of the fibers on about the middle line between cementum and bone. When I alluded to the statement so commonly made that the alveolo-dental membrane is almost identical with periosteum, Dr. Black remarked, "Why, no; it is very different from periosteum, as I will show you." Then he brought out his slide of periosteum. In this I observed a perfect identity with that portion of the alveolar membrane lying next to the bone, but found in it none of the straight parallel fibers seen in the layer next to the cementum,—confirming what I have here said of one layer of this membrane being but a continuation of the periosteum of the alveolar processes.

C. Heitzmann, in his "Microscopical Morphology of the Animal Body," permits Bödecker to say for him, that "only in a few specimens have I seen close around the root a thin layer of very dense and fine fibers, the general direction of which was not fully identical with that of the connective-tissue composing the main mass of the pericementum. There are two varieties of pericementum,—one of a reticular structure, the other altogether fibrous." Mark, Bödecker has seen a few specimens in which the fibers of the part next to the cementum are not identical with the part next to the bone; then says that there are "two varieties of pericementum." So we have a new phraseology for distinguishing between the parts. What one calls *parts* and another *layers*, he calls two *varieties*, —fibrous, and reticular. Thus, his observations are in perfect harmony with the idea of two distinct membranes, though teaching (no doubt from habit) with others the oneness of that membrane.

My fifth inquiry regards their functions. Are the functions the same? The outermost membrane forms bone, while the innermost membrane forms cementum. But bone and cementum are usually considered identical. Is it, however, safe, with all the differences of origin, structure, and relations of the organized tissues that form bone and cementum, to say that these two hard tissues are identical? Can we say more than that they are similar in their structure?

John Tomes, who has made special observations on the structure and development of bone and of cementum, after describing the processes of bone-formation, says, "The foregoing description of the formation of primary bone developed in connection with fibrous tissue might, with but slight modifications, be applied to the development of the cementum." Thus, he makes out the cementum to be *not* identical with bone, but *modified* bone. The observations of Mr. Tomes are in harmony with Sharpey and Shelly, both of whom made like investigations concerning these tissues,—which show that bone and cementum are not *perfectly* identical; that the cell of the cementum, the cementoblast, is a modified form of the osteoblast; and the resultant hard tissue a *modified* form of bone. Pathology will no doubt reveal to us a corresponding difference between the hypertrophy of cementum and the hypertrophy of bone; in other words, that there is a difference between *exostosis* and *excementosis*. This difference of function will more plainly appear in a future point of inquiry.

The sixth point of inquiry is, Have the two membranes, so closely in contact and united, different sources of nerve and vascular supply? We should naturally infer this difference if the grounds already taken are found tenable. If, with Legros and Magitot and Spence Bate and Charles Tomes and others, we find the membrane depositing the cementum to be of dermal origin, and from the same source as the pulp, we should expect it to derive its nerve and vascular supply from the same source as the pulp. If, with John Tomes, Wedl, Bate, Gray, and others, we find the membrane forming the bone of the socket is derived from the osseous system in common with other periosteal tissue, we should naturally expect it to derive its nerve and vascular supply from the same source. Wedl says ("Pathology of the Teeth," page 59), "The blood-vessels of the root membrane originate from three sources,—from the submucous connective-tissue of the gums; from the dental vessels that supply the pulp, and from the inter-alveolar vessels inclosed in a porous osseous canal." Of the nerve supplies he says, "They are branches of the dental and of the gingival nerves, and in part are composed of filaments which come through the foramina in the alveolar walls and from the alveolar canals." Thus we see they—both blood-vessels and nerves—come into the sockets of the teeth from two opposite directions: from the end of the root of the tooth and from over the margin of alveolar border; from the pulp on the one hand, and from the submucous tissue of the alveolar processes on the other. Be it remembered, however, that the submucous tissue on the thin alveolar processes is only periosteum. Other than these, the inter-alveolar canals afford a measured supply. Charles Tomes,

after stating that the root membrane and the pulp have a common origin, says, "A recognition of this fact makes it easier to realize how it comes about that their vascular and nervous supplies are so nearly identical." It is not necessary for Mr. Tomes to go beyond the nerve and vascular supplies of the pulp to quicken and nourish the root membrane, believing as he does that it is *one* membrane in all its relations and parts. For who can conceive of the necessity for any more extended sources of supply for a membrane so thin and delicate? Born of the same tissue as the pulp, it naturally takes with it its mother's blood and nerve. But if there be joined with it in close matrimonial alliance another membrane, born of other tissue, the osseous system, we should just as certainly expect that it, too, would take with it its mother's blood and nerve. Either supply would be ample for a single and inseparable membrane. The supply from both sources seems superfluous, except on the admission of the fact of the dual existence of the root membrane,—more properly called the *alveolo-dental membrane.*

I shall next, and lastly, inquire into the teachings of pathology on this subject. Irritations and inflammations follow the courses of the nerves and blood-vessels, both by contiguity of tissue and by their reflex and sympathetic relations. The nerves control functional action. The nerve supply to any organ is therefore the medium through which functional action in that organ is excited. Excitation too intense becomes irritation, and results in diseased functional action. This is as true of the alveolo-dental membrane as of any other organ. Under the influence of an irritant, affecting the root membrane through the medium of a diseased pulp, this membrane is liable to take on abnormal action, renew the formative processes, and deposit a superfluous amount of cementum on the root. The irritation and the inflammation are, in this case, communicated to the root-membrane through the nerves and blood-vessels supplying the root membrane and the pulp in common. This diseased condition, in which a superabundance of cementum is deposited upon the roots, is called in the books *exostosis,*—which should, with more propriety, be called *excementosis,*—thus recognizing the true location of the deposit on the previously formed cementum and not on the contiguous bone.

If, as is stated by Tomes and others, the nerves and blood-vessels follow the course of the fibers forming the membrane, and pass entirely through the membrane from one side to the other, thus supplying both parts or layers of the membrane with the same nerves and vessels, why are not both layers excited into the same renewal of functional action, and why do not both form a deposit of lime-salts upon the surfaces they respectively cover? Why do we not find both

exostosis and excementosis?—the one process forming an enlargement of bone in the direction of the root, and the other an enlargement of the root in the direction of the bone? The two enlargements impinging, ultimately, upon each other, would be fused; and we should find frequent cases of dental anchylosis,—or, speaking after the manner of the laity, "teeth grown to the jaw-bone." But such a case has never been found. It is only possible on the theory of the unity and inseparable character of the membrane; but rendered impossible on the theory of its dual character and relations.

When excementosis is found on two roots of the same tooth, it is not uncommon to find that the deposit, increasing from opposite directions, finally forms a contact and a complete fusion of the roots together, because both are under the influence of the same set of nerves. On the other hand, we never find exostosis of the socket and excementosis of the corresponding root; hence no osseous union of the two. Instead of the membrane covering the walls of the socket taking on formative action like its fellow, it takes up the work of absorption, and portions of the socket are removed, and the capacity of the alveolus is enlarged to make room for the excementitious enlargement. This makes it evident that they are *not* under the excitation of the same nerves. The vascular system, too, would be found contributing to the same ends. Nerves and blood-vessels attend each other in their developmental work, whether normal or abnormal. The inflammatory action in the membrane would induce a hyperemic condition to supply the material for the abnormal growth of cementum. If the same blood-vessels passed through to the other side of the membrane, and the superfluous amount of material was not utilized in new growth, as on the side toward the root, we should find extravasation of blood, breaking down of tissue, emigration of blood corpuscles, the formation of pus, and swelling of the parts,—such conditions as never attend excementosis.

In conclusion, let us sum up what we have found:

1. We have found that the alveolo-dental membrane is not identical with periosteum. It is like periosteum in that it exists in two layers; but in case of the root membrane they are *separable* layers, as demonstrated in tooth extraction. Periosteum has no layer of straight parallel fibers like the layer next to the cementum.

2. We have found that the two layers have not the same origin,—the one originating in the osseous system; the other originating in the dental follicle.

3. We have found that they differ in their structure—that the layer next to the cementum, after the parting of the fibers into a fine reticulum for the accommodation of the cementoblasts, are con-

spicuously blended into a band of nearly straight parallel fibers, pursuing an oblique direction until they reach the central portion, or the line of contact with the other layer, and here they are brought by a gentle curve into a line parallel with the outermost and innermost surfaces of the membrane; that by this loss of their obliquity we lose the evidence of their continuance through to the other side of the membrane and their union to the walls of the alveolus; that the membrane next to the walls of the alveolus conforms in its structure to that of ordinary periosteum; that they have strongly-marked histological differences.

4. We have found that they have different functions,—one being the organ of formation of the bone constituting the socket, and the other forming the cementum, and it is claimed by no reliable authority that these two tissues are identical; that the most that can be said is, that the cementoblast cell is a modified osteoblast.

5. We have found that they have different sources of nerve and vascular supplies,—that as nerves and blood-vessels have never been traced passing through from side to side, it is a case of the highest probability that the *different* sources of vascular and nerve supplies from opposite directions is a physiological necessity, because of the dual character of the membrane.

6. We have found that pathology points to the same facts,—that the difference in their susceptibility to diseased action, as in cases of cementosis (no cementitious union ever being formed between the root of the tooth and the bone of the socket), proves that the membranes covering these hard tissues respectively *are not under the control of the same nerves*, and are not supplied by the same blood-vessels.

7. We have found that the rapid and almost universal healing by absorption, without exfoliation, of the alveolar processes after the wound of extraction, gives the strongest possible evidence that the alveolar socket is lined with a membrane *after* the operation, which, with the membrane covering the root, amounts to demonstration of the duality of the alveolo-dental membrane.

Thus, surgery, pathology, and physiology are found in harmony with each other, demonstrating the same fact.

In this examination of the nature of the alveolo-dental membrane I make no claim to original investigation; I am not a microscopist; I have made use of others' eyes and of others' microscopes, and have trusted to what they have revealed. I offer the advantage of the same eyes and the same microscopes to you, and ask you what you see,—unity, or duality?

DENTAL CARIES.—III.

BY A. MORSMAN, M.D., D.D.S., IOWA CITY, IOWA.

(Continued from page 583.)

PART FIRST.—PREDISPONENTS.

3. Errors of Environment.

Under this heading I shall aim to consider those detrimental influences surrounding the teeth, external to them, and compatible with a normal systemic condition.

Primarily, isolated teeth demand our attention.

In dentures where, relative to the teeth, the jaw is disproportionately large, or where early extractions have removed adjoining teeth, isolation prevails to a greater or less extent. A large portion of carious cavities are approximal as to location. They are exceedingly frequent and destructive. From these the isolated tooth is comparatively free, although its organization and calcification be not of the best. There is, then, a dangerous environment produced when teeth are so placed in the dental arch as to be closely contiguous; and the cause lies in the greater freedom from extraneous matter of the tooth standing alone over those that are in contact.

The free flow of saliva, the action of the tongue and lips, all tend to keep the surfaces of the lone tooth clean, and the *materies morbi* cannot find a lodgment, while teeth that are in contact furnish in their interstices inaccessible to the tongue, lips, and partially to the saliva, an uninterrupted opportunity for the inception of the disease. This dangerous opportunity increases with increase of contiguous surface and its roughness. Hence crowding and all kinds of irregularities become predisponents of caries.

Illustrations can be seen in the overlapping of incisors, carious at the point of contact. I have just seen an especially illustrative case of the influence of contact,—a lower bicuspid twisted a quarter round on its axis, so that the buccal became the mesial and the lingual the distal surfaces. Caries had attacked both mesial and distal surfaces, as the tooth now stands, while these surfaces as the tooth *should* normally stand were free from disease,—an exact reverse in the position followed by a reverse from the customary location of caries in this tooth.

An exceedingly dangerous environment is the juxtaposition of a carious tooth-surface. For a long time it was believed that caries was contagious,—that is, in the sense of tooth to tooth contagion, both being in the same mouth. The opinion doubtless had its origin in this known liability of a carious cavity to infect an adjoining tooth. The observation was correct, the deduction erroneous. The cavity is simply a permanent and protected lodging-place for the

elements of the disease, which act not only upon the true walls of the cavity, but upon the adjacent tooth-surface, which virtually becomes also a wall. A carious cavity possesses no power upon the adjoining teeth unless there is an approximal opening. A tooth of such excellent structure as to resist all other environments cannot long resist this one. It is only a question of time.

Oral habits have much to do with the safety of the teeth. In some persons we find that the muscles surrounding the oral cavity and the teeth are almost constantly in use. The tongue is moved about over the surfaces of the teeth and suction applied to their interspaces. A frequent change of saliva is thus effected. Particles of food and débris are obnoxious, and are not allowed to remain. The saliva is either expectorated or swallowed. On the other hand, we have a class of patients who couldn't spit if they wanted to. All the muscles about the mouth are loose and flabby. Awake or asleep, there is no movement except in eating or talking. The saliva lies for hours in the mouth unchanged. There is no effort to expel or to swallow it; they can push it out with their tongue, or use a handkerchief to wipe out the mouth; but that is all they seem capable of. They seem to be insensible to particles of food about the teeth that would be an annoyance to one possessed of a normally sensitive mucous membrane. In this class of patients the saliva is usually thick and ropy, and hangs about the teeth. Caries is frequent and rapid in such mouths.

Some occupations predispose to caries. Persons subjected in any way to acid vapors, and workers in sugar-refineries, show an increased liability to caries.

Bakers and confectioners are especially subject to this disease,—due most probably to large consumption of saccharine and starchy foods, accompanied by lax habits as to cleanliness.

A layer of gum overlapping a wisdom tooth may become the predisposing cause of caries.

Bad dentistry often becomes inimical to the integrity of the tooth. A loose filling, held in place perhaps by an adjoining tooth, offers all the conditions essential to the certain reproduction of the disease the filling was inserted to cure. The margins of a cavity may not have been well formed, and softened portions or frail edges being afterwards broken down by mastication, a retentive condition is again established. The approximation of the filling material to the walls of the cavity was inaccurate when the work was done, or a portion of material has broken away; in either case a pocket is formed with the same result.

Caries from these causes is called "secondary caries;" but it is secondary simply in the sense that it is post-operative, and the term

has no significance. I do not mean to imply that all so-called secondary caries results from imperfect manipulation. An enamel surface that was, in its primitive condition, incapable of resistance cannot be made *more* resistive by the insertion of a filling, and it is many times impossible to so change the conditions that it does not remain subject to the same bad influences that caused the primary disease.

Dental prosthesis may also contribute its quota of predisposing influences, and in exactly the same way. Whenever an appliance is so constructed as to retain between its free border and the adjacent teeth particles of food and débris, the environment is a dangerous one. The constant wearing of metal plates and clasps upon teeth used to sustain them predisposes to caries. A favorable lodgment for caries may be produced by the gradual solution of the cement used to retain metallic caps on teeth, as is so often done now in inserting "bridge-work."

Accidental lesions do not quite come under this heading, but may be best considered here. Fractures, in proportion as they are extensive, or of a rough, jagged, and *retaining* shapes may be the seat of caries. Cracks and checks from thermal changes or abuse of teeth, if their environment is already bad, may accelerate the disease. I do not think that they often become carious when well located.

(To be continued.)

THE CATARRHAL NATURE OF PYORRHEA ALVEOLARIS.

BY J. D. PATTERSON, D.D.S., KANSAS CITY, MO.

(Read before the American Dental Association, at Minneapolis, Minn., August 6, 1885.)

THE especial object of this paper will be to present the study of the comparative pathology of pyorrhea alveolaris and catarrh. It is of absorbing interest if we can thus establish something of identity, and will aid in arriving at a more scientific method of treatment in the cure of so-called pyorrhea alveolaris.

The mucous surfaces are ever under suspicion of certain characteristic diseased conditions. These conditions vary in different territories of mucous surfaces as the anatomical form and structures vary. The mucous surfaces lining the respiratory tract are especially subject to a disease commonly called catarrh. The classical seat of catarrh is in the nasal passages; it also extends to the pharynx, the larynx, to the trachea, and to the bronchial tubes. The catarrh of the nasal mucous membrane being the commonest form, we will therefore observe its pathology to the exclusion of other

catarrhs. As the result of repeated attacks of cold, or as a chronic affection from the outset, or from irritation from dust or spores in the inspired air, we find the mucous membrane taking on an inflammation, and the prominent symptoms are, first, a phlegmonous appearance, swelling of the membrane, a profuse serous effusion, which excoriates the healthy parts over which it flows.

The next stages in the pathology of catarrh are marked by change in the character of the exudation, which, at first watery, now becomes filled with pus-corpuscles, and sometimes with blood-corpuscles, both red and white; the swelling increases, and hyperplasia of the membrane is exhibited. At this stage, and in its further progress, the disease is extremely infectious. The adjoining healthy parts are quickly invaded by the exudation from the diseased surfaces. The pharynx and larynx are especially subject to contamination because of their anatomical relation to the nasal passages.

The subsequent course of the disease gives rise to numerous complications. The atrophic form rapidly ensues; this results from destruction of function in the mucous membrane. Then crusts are formed, an ulcerative process is developed under the crusts, hypertrophy is present, and decomposition, with ozena, follows. Under the condition of hyperplasia, found in the progressed disease, are seen new formations and polypoid excrescences. The ulcers sometimes penetrate deeply and, after destroying the periosteum, produce caries. Catarrh may also invade the neighboring parts. It extends posteriorly into the pharynx, anteriorly to the epidermis and the cavities of the upper jaw. The ulcerative process under the crusts throws out chalky deposits and leads to bony formations.

Turning to the first symptoms of pyorrhea alveolaris, we find the festooned gum-edges are under an irritant; the ligamentum dentium is rapidly destroyed, loosening the gum from the tooth; the loosened gum weeps out a serumal effusion; there is increased presence of ropy saliva, and inflammation, not always indicated by redness. Next in order to first symptoms, we find increased tumefaction, a purplish tint of the gums, increased redness and congestion. The exudation has become purulent, filled with pus-corpuscles, and it burrows in places where the ligamentum dentium is destroyed. The teeth, partially deprived of their support, are frequently changed in position, protrude from their sockets, and are tender to the touch.

In further complications in pyorrhea alveolaris we find the pockets about the teeth becoming deeper; the septum of alveolar process between the affected teeth is blunted and finally absorbed, as are other territories of the process opposite the deepening and extending pockets, the destruction of the alveolar edge being greatest where the

wall is thinnest. In these later stages, and sometimes early in the disease, deposits are formed upon the roots of the teeth, sometimes in considerable quantity, and again in jagged, cactus-like points, and the whole invaded tooth-surface is bathed in pus. Unless resolution comes under treatment, the attachment of gum and process to the tooth is destroyed, and the tooth under movement of food or lips drops from its socket.

Thus, in brief, is described the comparative pathology of catarrh of the respiratory tract, and the disease we have denominated pyorrhea alveolaris. In the description of catarrh nothing is set down save upon the high authority of Ziemssen's Encyclopedia (see volume upon "Diseases of the Respiratory Organs"); also the work upon "Diseases of the Nose and Throat," by Dr. F. H. Bosworth, a celebrated specialist of New York, and these authors will be cited where other reference is made to catarrh and its general pathology further along in the presentation of this subject.

Your careful attention is now directed to the similarity of pathology in these two complaints in the following particulars:

1st. The similar appearance of the affected mucous membrane in both diseases, and in the various stages of each.

2d. The identical character of the effusions. First, serous, containing numerous epithelial scales; then becoming filled with pus-corpuscles and blood-corpuscles.

3d. The infectious nature of both diseases. Text-books all agree that catarrh is not only contagious, but sometimes even epidemic. The contagious nature of pyorrhea alveolaris is well-known to careful observers. From the gum or one or two teeth it rapidly contaminates the neighboring parts until the mucous membrane around each tooth is affected.

4th. The burrowing of pus, similar in each trouble.

5th. The tendency to destruction of periosteum and the underlying bone.

6th. The similar deposits thrown down in both diseases. It is scarcely necessary to again call attention to the fact of deposit accompanying pyorrhea alveolaris. It is so well known and so frequently encountered that all are familiar with it. It is not, however, generally known that accompanying catarrh there is also a deposit, thus forming a strong point of similarity in pathology with the other disease. In the volume of Ziemssen, before referred to, we find the following upon the complications of catarrh:

"The fluids retained may throw down chalky deposits, and thus form bony concretion" (page 141). * * * "These deposits are of variable hardness, and usually consist chiefly of phosphate and carbonate of lime. The mucous membrane of cavities contiguous to

the nose, particularly of the sphenoid bone, is especially liable to this change, but the membrane covering the turbinated bones may, too, be affected, developing, first, fine granular points, and afterward plates of calcareous matter."

The character of these deposits, and the manifestations of disease preceding their formation, point strongly to the conclusion that they are similar in origin to the deposits which are found in pyorrhea alveolaris.

In the literature of catarrh we do not find that the oral cavity is liable to the affection, but that catarrh is confined to the air passages proper. We find, however, that all territory towards the lungs and esophagus is rapidly affected by the contaminating discharge. While, from continuity of structure, the trachea and bronchial tubes are poisoned by a slight drainage, and much of the discharge necessarily passes innocuous into the stomach,—yet a large quantity of the discharge drips into the mouth from the nares, and is returned to the mouth from the throat by "hawking" to mix with and poison the sputa. Granting its presence in the mouth, let us recall its infectious character, its liability to attack mucous membranes, its known tendency to destroy periosteal attachment between bone and tissue; then place the facts side by side with the too well-known fact that a disease is common to the oral cavity whose pathology we have shown is coincident with that of catarrh, and what is a logical conclusion? Shall we not, instead of searching for constitutional anemia, or an ossific diathesis, first follow the readier tracings of local contamination?

Besides, a catarrhal condition of the mouth may originate in that cavity, and not be due to infection at all. If the oral cavity is used as an air passage in the pernicious habit of mouth-breathing, then we have all the factors presented for causing the disease without asking its presence in the nasal passages.

The mucous membrane at the festooned gum-edge is peculiarly liable to attacks of morbific agents; for in studying its anatomy we find it here presents numerous fine papillæ. The concavity presented at its union with the tooth also affords ready lodgment for irritating fluids, as we well know.

In thus briefly presenting the catarrhal nature of pyorrhea alveolaris to your consideration, the work of this paper is completed. No unjustifiable theories have been presented, but only well-established facts from, which a comparison of the two diseases has been made. Your attention is invited to the practical demonstration of identity, which can only be made from careful study of both complaints in all their history, and supplemented by your clinical records.

Concluding, I desire to say that I should not have ventured the foregoing observations had I not, after careful observation, become convinced of their value. My clinical experience during the past year, which embraces the time my attention has been given to the catarrhal nature of pyorrhea alveolaris, covering a record of some twenty-four cases, is as follows: Catarrh of the nasal passages, or of the pharynx and larynx,—generally combined,—*in every case;* in ten cases, the atropic or fetid form; in a majority of the cases breathing conducted almost entirely through the mouth, on account of stenosis of the nasal passages. In many of the cases catarrh was stoutly denied, but upon careful examination was found to be present.

Whatever the future may develop in the study of the causes of the disease we call pyorrhea alveolaris, and whatever personal observation may teach that differs from the past, yet these recent observations from my own practice have been an astonishment which has been uninterrupted by the testimony of any case presented for treatment during the period mentioned. The actual demonstration of the identity of these diseases must be left largely to the competent ability to diagnosticate the catarrhal presence. This ability cannot be made available without considerable study. The observer will find at the outset many difficulties. The history of catarrh is not yet very clear; the etiology is somewhat in dispute among those high in authority. The actual irritant in the catarrhal exudation is also a mooted question. Then, the history from the patient is often misleading. Those suffering from the disease will sometimes deny until denial is useless that they suffer from catarrh, and not until the atrophic, hypertrophic, and fetid forms are present will they admit the truth. It is not an infrequent occurrence in any dental practice to detect the peculiar catarrhal odor known to you all (and said by Dr. Bosworth to faintly remind of crushed bed-bugs more than anything else), and yet to find the patient professedly ignorant of the least trace of catarrh, and, if admitting anything, he will relegate the trouble to a simple "coryza." These and many other difficulties confront our investigation; but if with care we can arrive at some fixed point in the etiology of dental disease, our labor will be well repaid.

PATHOLOGY, THERAPEUTICS, AND MATERIA MEDICA.

BY A. W. HARLAN, M.D., CHICAGO, ILL.

(Read before the American Dental Association, at Minneapolis, Minn., August 6, 1885.)

THE discoveries of the past year in dental pathology are not sufficiently numerous to warrant even a summary of the contributions in this special field. The most important, the work of Miller, either

through lack of interest in strictly scientific investigation or failure to comprehend the vastness of his labors to elucidate the causes of dental caries, has not yet been entirely accepted by the mass of the profession.

The next most noteworthy contribution in the field of pathology has been the one which attempted to foist on the unsuspecting and guileless practitioner actinomycosis, or "lumpy" jaw, in the human subject. At least two cases have been reported during the past few months of ordinary alveolar abscess which were gravely declared to be "lumpy" jaw, and similar to that observed in cattle. Expert microscopists, after examination of the contents of the swellings, declared the micro-organisms to be veritable actinomyces.

A very exhaustive paper reviewing the work of Israel, Zollinger, Virchow, Duncker, and others accompanied the report of the first case. The second case, after the extraction of the tooth, recovered without any treatment, showing that lumpy jaw in the human subject need not necessarily be fatal, even though actinomyces be present in the pus of an alveolar abscess. In both cases the teeth were carious and unfilled, and, as has been shown by Zeigler and others, the actinomyces are almost constantly present in the mouth, air-passages, throat, intestinal canal, and elsewhere. It were the simplest and easiest matter in the world for this organism to be found in the pus taken from an alveolar abscess without a fistulous opening. Actinomyces have been found underneath the gum overlying an erupting wisdom-tooth without producing so-called "lumpy" jaw. They are instantly destroyed the moment they are exposed to free oxygen, and may, in consequence, be styled anærobic germs. The interest which these pseudo cases of actinomycosis have for dentists is this: Pus taken from blind abscesses should be examined under the microscope to discover if actinomyces are constantly present or only when the crown and root are unfilled; the organisms will not be found in the pus from a fistulous abscess.

Other papers, reports, and discussions on dental and oral diseases have failed to invite criticism or summarizing, on account of the paucity of ideas contained therein. The work which I have imposed upon myself in an investigation of the pathology of pyorrhea alveolaris is still unfinished, and I shall have to beg, as committees are wont to say, for further time.

In the domain of materia medica and therapeutics more activity has been shown, and the mass of the profession is gradually being weaned from the empirical use of only one or two remedies, and availing themselves of a more extended and useful knowledge,—a wider selection from materia medica. Although former years have given us the uses of a numerous list of drugs, yet none have created such

a widespread interest as cocaïne. It is hoped that a full discussion of its merits and failures will take place here. Having used it in all operations on the mouth and teeth, especially in the extraction of pulps and as an obtunder of sensitive dentine, I have come to the conclusion that we have a vastly more efficient remedy in the stronger tincture of cannabis indica, or the normal liquid (an extract), for such purposes, than any form of cocaïne that I am acquainted with. A tincture of the strength of ℥x of the flowering tops to alcohol Oj is sufficiently concentrated to obtund in from three to five minutes the most sensitive cavity in a tooth. The cavities should first be washed with tepid water to remove all débris, and the gums adjacent to the teeth to be operated upon painted with the fluid extract or tincture a minute before adjusting the rubber-dam. A clamp or ligature can then be adjusted without pain. I have removed the pulp from a tooth painlessly after saturating it with the stronger tincture in from five to eight minutes. The tincture of cannabis indica was first used in England about one year ago by Mr. Aronson to obtund the gums before extracting a tooth. It was used very much diluted in warm water; the gums were saturated by painting them; then the beaks of the forceps were warmed and dipped in the diluted tincture, and the patient was said to have felt no pain. My experience with cannabis indica has been as an obtunder of sensitive dentine, exposed pulps, and by injecting a weak extract into pyorrhea pockets previous to removing deposits from the roots. I have been unable to obtain good results by using cannabin, the active principle of cannabis indica. A patient should not be allowed to swallow a very large dose of the above tincture or fluid extract, as these proportions are about three times stronger than the ordinary tincture or extract. The antidote is the same as for opium.

Your attention is called for a moment to a consideration of resorcin and tereben, both antiseptics of great value to the dental surgeon. Resorcin is no new drug, as experimental therapeutists would testify; but its merits are little understood by dentists, and its use has been limited, even in general practice. It may be used in all conditions where carbolic acid has been indicated without the danger of the latter, as it is neither poisonous, except in very large doses, nor escharotic, except when used in crystals or powder. Tereben is the active principle of the oleum terebinthinæ, and has for composition $C_{10}\ H_{16}$. It is a transparent, limpid liquid, with no unpleasant odor or taste, and is a ready absorbent of oxygen. It is disinfectant, antiseptic, and stimulant. It may be used in and around the roots of teeth for all the usual purposes of disinfection and stimulation, and is especially useful for the destruction of anærobic

germs, such as are found in closed abscesses. It is not an obtunder of sensitive dentine, and is not used as a dressing for exposed pulps. It will destroy the foulest odor which proceeds from the decomposition of a pulp. It does not irritate the most sensitive surface, and it is especially useful as a dressing for root-canals when they are particularly mal-odorous. It dissolves readily in all the essential oils, and is a solvent for gutta-percha, iodine, various resins, and is soluble in alcohol, one part to ten. Its merits in the above-mentioned cases are undoubted, and a few trials will convince the most skeptical of its great efficiency.

CLINICAL REPORTS.

HOSPITAL OF ORAL SURGERY.

CLINIC OF PROFESSOR JAMES E. GARRETSON, M.D.

Removal of Incisor Branches of Inferior Maxillary Nerves.

The patient, a young gentleman, was brought into the amphitheater etherized. The "dis" in the case, as Prof. Garretson uses the word to express cause, or meaning, of lesion, was diagnosed to lie with injury of the incisive branches of the two inferior maxillary nerves, resulting from the kick of a horse. The person was a sufferer from convulsions. An inference, arrived at through the process of exclusion, both by Prof. Waugh and Dr. Garretson, attributed these convulsions to reflex disturbance arising out of the local condition. The proposition being to remove the involved nerves, a line was drawn around and below the chin reaching the mental foramina of either side. This line had the meaning of an operation which should be without scar, and which was not in a future to show evidence when the head was in an upright position with the face directed toward a *vis-à-vis*. Next, this line was drawn upward upon the bone, and the point of a catling-shaped blade was sunk to the jaw just in front of the mental foramen of the left side, the blade, with a sweep, being carried around the chin until an exactly opposite position was reached upon the right side. A succeeding step was the ligation of two arteries, while immediately following this the chin tissues were dissected from the jaw, care being taken not to disturb the inside mucous membrane, with a view to avoid entrance of blood into the mouth. The bone, freely exposed to view by this performance, was seen to be deformed through nodulated hypertrophy; the attention of the class being called to the condition.

Following the exposure was the use of a raspatory, a strip of periosteum, four lines in breadth, being scraped away from foramen to foramen. The flap being, at this stage of the operation, held

fairly clear of the bone by means of retractors, and all oozing of blood controlled, the convex-faced exposure of jaw was seen to be fully ready for the bur.

Prof. Garretson uses in all bone operations the surgical engine. In the present case a bur found to be dull was quickly replaced by a second of oblong form, new and exquisitely sharp, and it was not longer than five minutes when the canal underlying the anterior teeth from cuspis to cuspis lay open its entire length, with its contents wholly removed.

In concluding the operation stress was laid on the necessity for rounding and smoothing the cut surfaces of bone, and a free syringing of the parts with a view to getting clear of débris. These points being here attended to, the soft parts were brought into place, stitched, and compressed, with a view to securing union by first intention.

The line of incision was so perfectly suited to the intention that, when the flap had been stitched back to its place in the neck, and the head of the patient was lifted, nothing at all was to be seen indicating that an operation had been performed. Prof. Garretson was assisted as usual by his chief of clinic, Dr. Cryer, and by Dr. Shimwell.

Bony Anchylosis of Thirty Years' Standing.—Cure by Operation of Exsection.

The patient is a lady thirty-five years of age. Jaws immovably locked. The condition had its origin in an attack of scarlet fever, occurring in the fifth year of her age. At a previous clinic this person had been brought before the class, and had, with a view of securing absolute accuracy of diagnosis, been profoundly etherized, a result being confirmation of an opinion previously expressed, that the lesion lay with the right tempero-maxillary articulation, and that here was a complete osseous union of the two bones.

The patient being laid on the revolving table and re-anesthetized, the proposed operation was commenced, which considered the removal of a wedge of bone from the angle of the lower jaw, which wedge was to measure an inch across at its base, and four lines at its apex.

First, a shade line was made upon the neck just below the jaw, the object of which was to secure a position for the incision that would avoid an observable scar. Second, this line was drawn upward so that the knife, when laying it open, should reach and rest upon the bone. Third, attention was directed to the anatomy of the part, as this considered the relations of the parotid gland, facial artery, and action of the masseter and pterygoid muscles.

The point of the bistoury was sunk to the bone at a point midway

between the head and angle of the maxilla, and an incision carried downward and forward, securing an exposure two inches in length. An immediately succeeding step was the ligation of two arteries. Following the securing of these, the soft parts were pushed away from the seat of proposed section by means of a chisel-shaped blade inserted beneath the periosteum; great precaution being taken that no opening should be made into the mouth. This same manner of exposure was practiced as to the under face of the bone.

The seat of section thus clearly exposed and defined, and all oozing of blood controlled, an oblong bur one inch in length and one-twelfth in diameter was fixed to the engine, by means of which the removal of the wedge of jaw was quickly and happily effected. It is to be remarked, however, that on nearing the inner face of the bone, where the mylo-hyoid groove lodges the artery of the same name, the bur was changed for a second not so sharp, with a view of pushing the vessel away rather than cutting it.

In making the section the shredding effect of a bur on an artery was suggestively seen when the vessel of the dental canal was reached; a single spurt resulted from the cut, but coagulation to the extent of checking the hemorrhage was immediate. The section of bone away, the mouth of the lady was opened without difficulty, while the character of the motion looked to be perfectly natural.

The conclusion of the operation consisted in the introduction of a drain-tent laid between the divided ends of the jaw, and approximating the remainder of the wound by stitches made in the manner of the interrupted suture.

Prof. Garretson called attention to Rissoli's method of forming a false joint by a line separation, made through a puncture by means of a delicate saw; also to the use of the chain-saw, of the circular and Hey saws; also to the reciprocal saw devised by Dr. Bonwill. Preference, it was remarked, was given to Esmarch's operation, as here performed, for the reason that it not only allowed of all the steps of the performance being clearly seen, but afforded the best chance for securing free motion in the artificial joint. Attention was directed to the harmlessness of the open wound made, and also to a preference, not unwisely, to be given to the employment of burs over other cutting means.

Besides, the ordinary class, quite a number of visitors witnessed the operation.

Epulo-Fibroma.—Removal by Exsection.

The patient is a lady about thirty years of age. Position of tumor, upper jaw, left side. Growth surrounded the cuspid tooth.

The lesion being small, and of the fibromatous variety of the

Epulides, limited ablation of bone was deemed sufficient to a cure. The operation was performed in a very few minutes; beginning with the extraction of the lateral incisor and the second bicuspid, passing from this to incising about the growth by lines meeting at right angles, and in using this exposure of the bone to take away the section by means of a circular saw. Three arteries jetting from the cut bone were controlled by means of points of match-sticks thrust into them.

The subject of the epulides was remarked by the lecturer to be of great interest, as the good of sufferers was concerned, and one not clearly appreciated and yet most easily appreciable.

Prof. Garretson remarked that experienced surgeons found it wise to treat every tumor of the mouth as a cancer which could not be demonstrated to be something else. This, he said, was a necessary rule of practice; it implied, however, exhaustive familiarity with the subject; otherwise lamentable and inexcusable blunders would be common.

CORRESPONDENCE.

CONCERNING SEPARATORS.

To the Editor of the Dental Cosmos:

In the October number of the Dental Cosmos appears a letter from Dr. Bogue on the subject of separators, which is as unfair as it is uncalled for. It is unfair because it implies what it does not assert, and it is uncalled for because from the time of exhibiting my first separator to the present moment I have given him no just cause for complaint. In his communication Dr. Bogue regrets that in my article concerning separators, published in the August number of the Dental Cosmos, I failed to mention the fact that between 1878 or '79 and 1882 I did no work on the separators *practically*. If this means anything, it means that Dr. Bogue considers he had a right, therefore, to enter the field and complete what I had commenced. If this were granted, it still remains true that, considering our long friendship, and the fact that years ago I gave him one of my original patterns, which was known in his office to gentlemen connected therewith as the "Perry pattern," he ought to have come to me to know if my patterns were under way or completed, or if I was out of the field entirely, before going to Paris and bringing out and illustrating a set of separators which were only a modification of my own. In doing this even, if he had fairly given me credit for what I had done, he might have been excused by those not over-sensitive to the unwritten law of ethics that is supposed to hold among gen-

tlemen. But what can be said when it is known that in the paper in which he described these separators before the Société Odontologique de France he did not mention my name! At a previous meeting of this society he had said that Dr. Jarvis was the first to separate teeth with a screw, and that Dr. Perry had improved on his instrument. In his paper the nearest approach to giving me credit for what I had done was the following sentence: "I must repeat to you with additional emphasis what I said at the October meeting." Consequently, those who heard the paper read, or those who saw it in print with the illustrations, must have assumed that the separators were Dr. Bogue's invention.

I have in my possession a copy, bound in pamphlet form, of Dr. Bogue's paper, with the illustrations, reprinted from the *Revue Odontologique*, in which my name does not appear.

Dr. Bogue further states that I was only aroused to begin work on the instrument after seeing his model in an incomplete state in the hands of Dr. C. L. Brown, etc. This paragraph implies that I profited by the sight of this instrument, and that I must have modified my unfinished patterns. I emphatically deny that it caused me to change the plan of my separators, the patterns for which I had cut from brass in the rough before 1880. If it had done so these rough patterns, which were finally finished and sent to The S. S. White Dental Manufacturing Co., could not have been made to answer. Moreover, if I had changed my plan, and had felt that I had embodied Dr. Bogue's ideas, I could not have exhibited and described my separators, as I did, before the New York Odontological Society, without being reminded to mention Dr. Bogue's name and give him credit. No one knows this better than Dr. Bogue.

The largeness of bow was the only point of resemblance between the separator in Dr. Brown's possession and my finished incisor separator. But Dr. Brown's separator was large enough to go over all the teeth, and consequently to fit badly upon all, while mine was made only for the incisors and lower bicuspids. This separator was the one which Dr. Bogue, in his note appended to his translation, published in the March number of the Dental Cosmos, acknowledged as superior to his. Not superior to the incomplete one in Dr. Brown's possession, which I had seen, but superior even to Dr. Bogue's latest, which I had not seen. Wherein, then, was I indebted for a sight of the one in Dr. Brown's possession, which Dr. Bogue himself describes as "incomplete?"

Dr. Bogue further says, "The separators designed by me were first publicly exhibited before the profession on May 6, 1884, at a clinic at the depot of The S. S. White Dental Manufacturing Co. So I fail to understand Dr. Perry's statement that he knew nothing of them,

for he was present on that date at the evening meeting of the First District Dental Society." This implies that I made a statement which was not true. The facts were that the clinic was given at one place in the afternoon and the meeting was held at another place in the evening. The separator was shown at the clinic, which I did not attend. It was not shown, nor even described, at the evening meeting, which I did attend. In describing in the evening the operation which he performed in the afternoon, Dr. Bogue said that he used the screw separator; not my separator, nor his, nor any improvement on either, but *the* screw separator. Why did he not give me credit for my share of the invention, and describe and claim his improvements, or else claim the whole and give me an opportunity, then and there, to call him to an account?

The separator which he spoke of, and which I had heard of from other sources, conveyed to my mind the idea of the separator which I had seen in Dr. Brown's possession, for, I repeat, what I clearly stated in my paper, that "I had no knowledge whatever that Dr. Bogue had made any further effort to make separators of this class useful." Furthermore, while the date of this clinic was May, 1884, my separator patterns were finished and in the hands of The S. S. White Dental Manufacturing Co. in November, 1883.

As to my haste in "getting a separator called the Perry separator on the market," I think it sufficient to say that my patterns were finished in November, 1883, and the separators were ready for exhibision at Saratoga in August, 1884. Perhaps I should have "hastened" and been present to present them if I had known another set was impending. They were exhibited before the New York Odontological Society in October, 1884, and not advertised in the DENTAL COSMOS until February, 1885. This advertisement was a matter of business on the part of The S. S. White Dental Manufacturing Co., and, of course, one with which I had absolutely nothing to do.

Dr. Bogue further says that, if I had been frank with him, as he certainly meant to be with me, he would have gladly shown me over some of the difficulties, etc. Why should I have been frank with him in working out my own inventions? Yet I was so, even to giving him one of my patterns. If Dr. Bogue meant to be frank with me, as he claims, I think the facts I have stated show how signally he failed.

I am at a loss to understand the reason for the pervading tone of Dr. Bogue's communication. I can well understand that, having, as he says, been to the expense of forty different instruments, and having given five years' work, he may feel that he is entitled to recognition, and ought to have a separator on the market called the Bogue separator. This is quite legitimate, but it should not lead

him into an attack on me. I have no desire to occupy the separator field exclusively. Dr. Bogue paid me a compliment by being the first to appreciate the importance of my separator, and he is undoubtedly entitled to recognition for what he has independently done to perfect the device. No one has been more ready than I to accord him this recognition. In proof of this, I quote from a letter of mine written to Dr. J. W. White on the same date that Dr. Bogue's complimentary notice of my incisor separator was written, namely, February 14, 1885: "A comparison of notes with Dr. Bogue has brought out the fact that, working independently of each other, we have reached nearly the same results. * * * Of course I am only too glad to give him full credit for all that he has done, which I shall take occasion to do at all times." Does this look as if I wanted to crowd him out of the separator field? In further proof of my desire to treat him fairly, I beg those who take any interest in this deplorable matter to read my August article, in which, at the earliest moment, I made honorable mention of what he had done. Therefore, I repeat that Dr. Bogue's letter in the October number of the Dental Cosmos was uncalled for.

If I have been compelled in this communication to speak plainly, it has not been because of my own choice.

S. G. Perry.

No. 46 West Thirty-seventh Street,
New York, October 10, 1885.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION—TWENTY-FIFTH ANNUAL SESSION.

(Continued from page 610.)

Dr. W. H. Morgan, Nashville, considered the medication of roots intended to be crowned absolutely necessary. Unless they are in proper condition before the crown is set, your patient will have trouble and you will score a failure. He has seen operations where the crown of a pulpless tooth has been removed, the artificial crown mounted, and the operation completed at a single sitting, without the root being treated or the canals filled. This he considered an unsafe method of practice. The pulp-cavity should be put into proper condition, or there will likely be pericementitis. In filling teeth some operators prepare their gold in such a way that it takes three times as much force to get it to place as is necessary. Every angle made in a pellet requires that much more force to impact it. Gold in its best condition for dentists' use has a

smooth surface. If you want to introduce it with ease you must avoid angles as far as possible. Some one has said that a filling for the best service should be perfectly solid. The speaker was sure that the gentleman who made the remark was mistaken. There are fillings where absolute solidity would be a disadvantage. First, from the conduction of thermal changes, and then, from the expansion of the fillings through ordinary changes of temperature, in a little while you will find the frail edges of the enamel breaking down. He did not know if he understood Dr. Allport correctly, but there is no question that we do save teeth now with cohesive gold that the fathers condemned to the forceps. Dr. Morgan finds matrices frequently of great value in filling cavities, but stress was laid by one of the speakers on the fact that they make simple cavities out of compound ones. In the speaker's experience compound cavities were sometimes easier to fill than simple ones. Approximal cavities in the second and third upper molars, where there is considerable convexity on the surfaces of the teeth, are more readily filled without the matrix than with it, because you can see what you are doing.

Dr. Allport wished to say a word in reply to Dr. McKellops as to his method of annealing gold. Dr. McKellops asserts that he (Dr. Allport) anneals his gold and uses the mallet, and therefore he must use cohesive gold. The speaker would say that he does anneal his gold,—just a little portion of it; and he does use the mallet, because he can do so to advantage in his method of filling with soft gold; and so could others if they would try the same plan. To describe that method, suppose we make a retaining-pit (something which he seldom does). He claimed that no man could fill that retaining-pit as perfectly with cohesive gold as with non-cohesive. His way is to take the pellet and anneal a little of one end; then put the non-cohesive portion of the pellet into the retaining-pit, filling it perfectly with the non-cohesive gold, and leaving the little point which has been annealed and thus made cohesive sticking out. He then puts more non-cohesive foil to this, the annealed ends of the pellets becoming in turn retaining-points.

Dr. Kulp had had some personal experience with bridge-work. Some years ago he lost a bicuspid and cuspid from the left side of the upper jaw, and tried some twenty artificial teeth on plates, but they were all failures. Later he lost the first upper molar on the same side of the mouth, after which mastication became difficult. His remaining molars began to abrade, and the front teeth began to push forward, one or two of them getting sore. He then tried bridge-work, which he had now worn for two years, and it had given him exceeding satisfaction, banishing the annoyance of trying to speak with a piece of plate-work in the mouth. He had since

put in quite a number of bridges for his patients, and gratified them to a much greater degree than with any other method of inserting artificial teeth in all his years of practice.

Dr. J. J. R. Patrick, Belleville, Ill. It is the first duty of every man to know what the materials are with which he works. We have heard here the words cohesive and non-cohesive, and adhesive and non-adhesive, used in a way to indicate that there is some confusion of terms in the minds of some of the speakers. All gold is cohesive if pure. There is a great variety of names attached to forms of gold intended for dentists' use, but they do not always indicate clearly the characteristic properties of the preparations. It ought to be the dentist's first duty to know the chemical properties of the material he is using. "Adhesive" is not properly applicable to the union of molecules of the same solid when brought into contact, for adhesion is a force which unites the particles of different substances. Gold possesses, in an eminent degree, the molecular force which unites the particles of the same kind of matter, and it is, therefore, very cohesive, and consequently not adhesive. Its working properties may be modified, rolling or beating driving the particles together and presenting the quality called hardness or compactness. Again, the application of heat overcomes the cohesion of its particles, and we have the property of softness. In the degrees of softness it might be called cohesive, because in this condition its particles would more readily cohere under percussion or pressure; but in degrees of hardness it might, in a relative sense, be called non-cohesive, because its particles would present more resistance to percussion than when in a soft condition. With regard to filling teeth, Dr. Patrick declared he had no system. Much time has been spent here and elsewhere in discussing the Herbst method, which is valuable as the badly-built school-house is to the architect; it shows him how to build a better. The Herbst method is a system of burnishing, and he doubted if burnishing would give as good cohesion as a blow. In his opinion, the roughened instruments were improvements over the smooth burnishers, because they give what is really the impact of a blow.

Dr. W. C. Dyer, Chicago. There seems to be a misunderstanding of the terms adhesive and cohesive gold; if pure, gold is cohesive. Adhesion signifies the union of two separate bodies; cohesion the union of like molecules of the same substance. We speak of cohesive and soft golds. Soft gold is not as soft in fact as the cohesive is after being passed through the flame of a lamp, but it seems to be softer.

Dr. W. B. Ames, Chicago, is very much in favor of eclecticism in practice, but a mixture of methods that he could hardly believe in is starting a filling with the Herbst burnishers and finishing it with the electric mallet. He could not see the consistency of placing a

soft mass in the bottom of a cavity and using the mallet blow to complete the filling. By using soft cylinders, put in with hand or mallet force, one can get a proper foundation to stand the heavy blow of the mallet in finishing. In the inaccessible parts of cavities he thought we should lay the mallet aside and use hand-pressure, whether we fill with non-cohesive or cohesive gold.

Dr. J. Taft, Cincinnati. The Herbst method does not stand as the only method in which the burnishing of gold into cavities has been practiced. At the International Congress in 1881 some specimens of fillings by Dr. A. A. Blount, of Geneva, Switzerland, were shown, which embraced practically the same method. In these specimens the cavities were lined with soft gold, burnished in with smooth-end instruments, the center of each cavity being filled with soft gold. Dr. Blount, it was said, had used these instruments in this way for several years. That better adaptation to the walls was secured than by any other method then in vogue was evident to those who saw the specimens. The cavity was prepared perfectly, and then with the smooth instruments the gold was burnished against the wall, all around it first, thus forming a lining, instead of completing the filling as the work went on. Dr. Taft did not regard Dr. Daboll's advice to all young men to study the matrix and use it in approximal fillings as sound teaching. Dr. D. stated that its use would reduce all cavities to simple ones. If you proceed on that assumption, disaster will almost surely follow. There must be perfect adaptation of the matrix, and in some cases it is almost impossible to get it, and it requires more skill than is ordinarily employed or possessed by many dentists. He would not advise the use of the matrix where you can fill without it. Dr. Patrick said that no man ought to use any material until he knows all about it. If that rule were followed, many of us would have to go to school. In reply to a question, Dr. Taft stated that the terms "soft" and "non-cohesive" were commonly used interchangeably. In some cases gold which is soft is non-cohesive; in others soft gold is cohesive. Some golds are very soft, and will yet weld. All we know about it is that there is a great difference in the behavior of gold under different treatment. He attributed the variations which have been spoken of to the manipulation which the gold has undergone in manufacture.

Dr. T. W. Brophy, Chicago. Cohesive gold subjected to the fumes of aqua ammonia becomes non-cohesive. It is immaterial, he said, whether he buys cohesive or non-cohesive foil. If he wants cohesive gold he anneals it; if he wants non-cohesive, he places it in a drawer in which he keeps a bottle of ammonia water. With regard to bridge-work, while it is desirable to place something in the mouth

that will be strong and durable, without the necessity of a plate, he regretted to say that he had not seen anything in this direction that was satisfactory. For one or two teeth it may be all right, but where four or five, or even three, are included, it will soon result in failure. He would like to know how to secure absolute adaptation of the bands to teeth which lean toward each other. There will be a space at the bottom in which secretions will accumulate and eventually cause the destruction of the teeth to which they are attached.

Dr. W. P. Horton, Cleveland, thought the discussion had taken so wide a range that he was tempted to ask, What is it? A good deal has been said about the different kinds of gold which would have been more intelligible if we had a definite nomenclature, so that when we said a thing all would know exactly what was meant. The introduction of cohesive gold opened up a wide field, and hundreds of teeth are saved to-day where one was preserved in the old days. The Herbst method may be regarded as another important improvement. Dr. Blount did give the rotary motion in his method, but he used hand instruments instead of the engine, and did not put in the whole filling in that way,—only a part of it. We should all of us be acquainted with every method that is of value, so as to be enabled to use any part of any method wherever its use will be of advantage.

Dr. Thomas believed that Dr. McKellops, who made the remark that approximal cavities could not be so well filled without the matrix as with it, had made a great many good fillings of this class before he knew there was such a thing as a matrix. With reference to Dr. Allport's method of filling retaining-points, he should reverse the order, placing the cohesive end of the pellet in the retaining-point. He could not see why we could depend upon the unannealed point in the pit and not in the cavity.

Section IV was passed.

Second Day.—*Evening Session.*

The association met at 8 o'clock. President Crouse in the chair.

The special order for the session was the report of Section V, Anatomy, Histology, and Microscopy, which was read by Dr. Frank Abbott, of New York, as follows:

Mr. President: To my knowledge there has been very little accomplished the past year in Histology or Microscopy bearing directly upon the teeth.

Of course, more or less has been done by the advocates of the septic theory of all kinds of pathological condition to which human beings are subject to prove their position correct, and by those op-

posed to such theory to prove them incorrect. These latter "unbelievers" have made, it appears, several rather startling points, to say the least, which favor their position, viz.: M. Ducleaux has recently sent a communication to the Académie des Sciences on "The Germination of Plants in Soil Freed from Micro-Organisms." He chose for his experiments the Dutch pea and the haricot bean, the first of which has its cotyledon in the earth, the second on the surface. The soil having been sterilized before the seed was sown, germination did not take place. This soil was also covered with milk, but this was not altered. Thus it seems that it is essential to germination that there be micro-organisms in the earth. M. Pasteur also states that he "has found by experiment on animals, that food which is free from micro-organisms cannot be digested, as they are necessary to the process of digestion."—*Journal of the American Medical Association.*

Comment upon the above quotation seems unnecessary. It puts a *large organism* into the "thinking-cap" of every thoughtful dentist.

One step toward the more perfect illustration of the finer structure of tissues has been made (so I am informed upon the best of authority), which will prove of great service to all microscopists, viz.: Stricker, of Vienna, has invented a "micro-stereopticon" (this name is mine), by which an ordinary slide may be used, and the "field" magnified to the enormous extent of 12,000 diameters, and projected upon a screen, so that a thousand people may study the tissue at the same time. The reticulum in the amœba and in the colorless blood-corpuscle is made so plain that no one can question it. Our theories in reference to the physiology and pathology of teeth are soon to be either established beyond a doubt or are to be disproved. What a relief this will be to the strained minds of some who are particularly interested in these questions! I expect within a few weeks to have the pleasure of seeing one of these instruments and witnessing its wonderful developments.

All I have to offer for Section V is a voluntary paper by Prof. L. C. Ingersoll, entitled "The Alveolo-Dental Membrane: Unity or Duality—Which?" and the result of some of my own work during the past year, which I present under the heading of "Studies of the Pathology of Enamel of Human Teeth."

Dr. Abbott said that, before reading his paper, he wished to acknowledge his indebtedness to Prof. Heitzmann for the very excellent drawings which he should show, and for other assistance in the preparation of the paper.

The specimens from which two of the drawings were made, he said, were under the microscopes on the table, and he would be glad if those present would examine them.

Dr. Abbott then read his paper, entitled "Studies of the Pathology of Enamel of Human Teeth, with Special Reference to the Etiology of Caries."*

Dr. C. N. Peirce, Philadelphia, wished to congratulate the association on the opportunity it had just enjoyed of listening to the results of the joint investigations of Professors Heitzmann and Abbott. The drawings which have been exhibited show many points about the hard structures of the teeth which are not easily brought before an association. The first diagram illustrates a condition that must have been confirmed in the embryo. The line showing the projection of the dentine up into the enamel must have assumed its shape before the fifteenth or sixteenth week of intra-uteiine life, because calcification begins about that time. The dentine must have assumed its peculiar convoluted appearance before it was made permanent by the deposition of lime-salts. We have here an illustration of how a change of structure is effected by the delegation of nutrition to some other locality. The point which shows above the dentine in the enamel was caused by a peculiar condition of the nutritive currents. We should always bear in mind, in considering these hard structures of the teeth, how readily they are changed when in their formative stage, early in life. The lines or rings on the section of a tree, which used to be thought to indicate the age of the tree, represent periods of growth. Sometimes two or three of these occur in a year, though usually there is only one. When more than one period occurs in a year it is owing to better nutrition and more favorable influence during that year. The enamel-layers of the tooth are like the rings in the tree. They show periods of growth. The soft tissues do not much exceed the hard in their rate of growth. That is, the soft tissues are not all formed before the hard; and during the period of formation some systemic condition may interfere to cause loss of continuity.

Dr. W. H. Atkinson, New York, was delighted with these specimens of proofs of the idealisms of tooth-structures. We may make a very good case out of an anomalous one, if we take it to be the regular order. If he understood the matter, we will find that it is not always the office of the enamel-pulp to be finally elaborated into the prisms or rods of the enamel and their interspaces; and this leads us to inquire into the the signification of all teeth having an enamel-cap. What becomes of the enamel-cap which presided over the formation in the embryonal condition is not settled. Sometimes it is worn off. It is always formed within Nasmyth's membrane when there is no interference with the currents of growth.

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*This paper will be found at page 641, current number DENTAL COSMOS.

The very fact that the enamel has nutrition settles the question as to whether it is a vegetable or a mineral or an animal structure. The condition shown in the specimen No. 1 comes about simply by a rift in the lower border of the enamel-cap, allowing the ameloblasts to persist beyond their normal life; so that it can hardly be called abnormal. Invariably this is attributed to a want of lime, which he denied. There is as much lime there, pro rata, as anywhere else in well-formed teeth. The difficulty is a lack of consolidation. What that is cannot be determined until we have made many more observations. He hailed the ambition of anyone to work at this subject, and he did not care why the work was undertaken. We owe a debt of gratitude to Dr. Bödecker for his demonstration of the living matter in the hard structures of the tooth. But it does not matter how these breaks in continuity come about. When we speak of the etiology of decay, we must go behind all manifestation of decay, and if we say the cause is a microbe, we must know whether the microbe is necessary. He would ask, what is sterilized earth? It has been said that we must have the mineral before the vegetable, the vegetable before the animal. Those who speak thus have forgotten that the first differentiation of matter is the protista, which may be a mineral or not, according to its environment. We must get out of the old "organic" and "inorganic" ruts; we must have something which will blend them. Water is said to be a mineral. It is organic. There is really no inorganic matter except simple atoms.

Dr. A. H. Thompson, Topeka, Kansas, wished to ask concerning the structure of the chalky spots shown in the illustration. Is the difference due to deficiency of lime-salts, or a deficiency of organic mineral elements?

Dr. Abbott. The only evidence that there is a diminution of lime-salts is the greater proportion of organic material, seen in the specimen under the microscope. It shows two or three times the amount found in normal enamel. The lime-salts are not so well organized as in sound structure, being loose, comparatively. With regard to the statement about sterilized earth, that was a quotation from the French, which he had given as he found it.

Dr. T. W. Brophy, Chicago. Dr. Abbott states that defects which are found in enamel when the teeth are erupted are always congenital.

Dr. Abbott could not see how it could be otherwise.

Dr. Brophy. According to Dr. Eames (and his view is indorsed by Dr. Black), these defects in the enamel can be caused by absorption, and by the same agent which brings about absorption of the deciduous teeth. The speaker had seen cases in which he was sat-

isfied there had been considerable destruction of the enamel of the permanent teeth through retaining the temporary teeth too long.

Dr. Abbott. It is almost impossible that the condition referred to should occur after eruption, except that it might be possible, where one of the strata runs out of the surface, and is of a porous nature, for something to enter the enamel at that point and affect it along that line for some distance; and the process might be of such a nature as to justify the thought that absorption caused it. For himself, he hardly thought it occurred so; he had never seen nor heard of such a case.

Dr. H. H. Keith, St. Louis, had a peculiar incident of practice which seemed to support the view presented by Prof. Abbott. He had fitted a regulating plate in the mouth of a little girl, the plate covering one of the deciduous teeth. The patient was absent some two or three weeks. When the plate was removed, upon her return, he found the crown of the deciduous tooth spoken of in the plate. All the dentine was gone, but the enamel was all there.

Dr. Atkinson stated that he had given Dr. Abbott a section made twenty-seven years ago, which showed this very thing,—the enamel taken up by the same process which absorbs the dentine. Now, it must be reduced to a fluid before it is unbuilt. He has two sections yet uncut which have bay-like excavations in the enamel. Dr. Abbott, a long time ago, gave him a superior bicuspid which had lost two-thirds of its roots by absorption, and it was also perforated, to all appearances, by two beautiful drill-holes. How the absorption went across the tooth he did not know.

Dr. Abbott. The specimen which Dr. Atkinson spoke of was a temporary tooth. It was not one of this kind of cases, and its condition has no bearing on the subject under discussion. It was a case of absorption, while these show imperfect development of the enamel. He felt quite indignant that Dr. Atkinson had not ground the specimen which he gave him twenty years ago.

Dr. L. C. Ingersoll read a paper entitled "The Alveolo-Dental Membrane: Unity or Duality—Which?" *

Adjourned.

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During the morning session of the third day the resignation of Dr. George A. Mills as a member of the association was received and accepted.

The subject of Operative Dentistry was again taken up and the discussion concluded. The report of this discussion will be found in the October and November issues of the Dental Cosmos.

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*This paper will be found at page 653, current number Dental Cosmos.

Dr. Peirce, from the committee appointed to consider the suggestions contained in the president's address, reported a resolution appropriating $100 to each of the Sections V, VI, and VII, to be expended by them in the prosecution of their work.

On motion of Dr. H. A. Smith, the amount was made $200 to each, and the resolution as amended was adopted.

(To be Continued.)

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The officers of this society desire to make the present year one of unusual interest to its members, and to the dental profession generally, which is hereby cordially invited to attend its meetings. It has been arranged to give clinics of a novel nature, and papers that will be practical, instructive, and entertaining.

In addition to the regular meetings, a number of special meetings will be held, at dates to be fixed later, when clinics and papers will be given by the following-named gentlemen:

Clinic and paper by Dr. Wm. Herbst, Bremen, Germany, inventor of the Herbst method of filling teeth.

Paper by M. Whilldin Foster, M.D., D.D.S., professor of dental mechanism and metallurgy in the Baltimore College of Dental Surgery, on "Abnormal Conditions of the Antrum and Restorative Treatment."

Clinic and paper by Dr. H. C. Register, Philadelphia.

Clinic and paper by Dr. E. Parmly Brown, Flushing, L. I., on "New Porcelain Bridge and Crown Work."

A lecture on "Facial Expression," by a very eminent sculptor of New York City, illustrated by clay modeling, pre-historic skulls, etc.

Regular Meetings.

Tuesday evening, November 3, 1885. J. N. Farrar, M.D., D.D.S., on "Mechanical Appliances for Correcting Irregularities of the Teeth," with blackboard illustrations.

Tuesday evening, December 1, 1885. Edwin T. Darby, M.D., D.D.S., professor of operative dentistry and dental histology in the University of Pennsylvania, on "Erosion of the Teeth: Its Cause and Treatment."

Tuesday evening, January 5, 1886. S. H. Guilford, A.M., D.D.S., professor of operative and prosthetic dentistry in the Philadelphia Dental College and Hospital of Oral Surgery, on "The Band Matrix and its Uses."

Tuesday evening, February 2, 1886. Frank Abbott, M.D., professor of operative dentistry and dental therapeutics in the New York College of Dentistry, on "The Treatment of Pulpless Teeth."

Tuesday evening, March 2, 1886. John J. R. Patrick, D.D.S., Belleville, Ill., on "Progressive and Retrogressive Physiological Metamorphosis of the Jaws and Teeth."

W. W. Walker, *Chairman of Executive Committee.*

NEBRASKA STATE DENTAL SOCIETY.

The ninth annual meeting of the Nebraska State Dental Society was held at Lincoln, May 13 and 14, 1885.

There was a large attendance, and eleven names were added to the list of membership. The following officers were duly elected for the ensuing year:

J. J. Willey, president; A. P. Johnson, vice-president; L. S. Moore, corresponding secretary, Fairmount; C. R. Tefft, secretary and treasurer; I. W. Funck, A. W. Nason, and O. P. Baker, executive committee; J. W. Chadduck, W. H. Stryker, and J. N. Hopper, committee on membership; C. R. Tefft, F. L. Browne, and T. I. Hatfield, committee on publication.

The next meeting will be held at Beatrice, May 18, 19, and 20, 1886.

MINNESOTA STATE BOARD OF DENTAL EXAMINERS.

The Minnesota State Board of Dental Examiners will meet on Tuesday, the 1st day of December, 1885, at the Ryan Hotel, in St. Paul, for the purpose of examining candidates for admission to practice in the State, and to indorse diplomas.

J. H. Martindale, *Secretary*, Minneapolis, Minn.

BIBLIOGRAPHICAL.

Dental Bibliography: A Standard Reference List of Books on Dentistry published throughout the world from 1536 to 1885. Arranged chronologically, and supplemented with a complete Cross-Reference to Authors. Compiled by C. Geo. Crowley. 180 pages. Philadelphia: The S. S. White Dental Manufacturing Co., 1885. Price, cloth, $2.00.

We have in this volume the outcome of a long and laborious effort to present a complete list of distinctive works on dental subjects which have been published throughout the world from the earliest times. It catalogues 2047 titles, printed in the various languages in which the books appeared, and chronologically arranged. The work is divided into five departments or sections. Section I contains books published in Germany, Austria, Holland, Norway, Sweden, Denmark, and Switzerland (German); Section II books published in France, Belgium, and Switzerland (French); Section III books published in Spain and Italy; Section IV books published in Great Britain and Ireland; Section V books published in America. An author's index appended in alphabetical order gives cross-reference to all the volumes catalogued.

No attempt to compile and publish a complete dental bibliography has heretofore been made, and this volume is the only work of its kind in existence. One who has never engaged in such an effort can form no adequate idea of the amount of labor involved in the production of a bibliography of this character. The work must prove invaluable to those engaged in the formation of dental libraries, and to those desiring to study the literature of any dental subject. The thanks of the dental profession are certainly due to the publisher, to whom it must have been evident in advance that the enterprise would result in pecuniary loss, but who nevertheless spared no expense necessary to the production of a volume of which every dentist may justly feel proud. A copy of this book should be in the library of every member of the profession who aspires to a familiarity with the literature of his specialty.—J. H. S.

The Essentials of Histology. Descriptive and Practical. For the use of Students. By E. A. Schafer, F. R. S., Jodrell professor of physiology in University College, London, etc. Octavo, 245 pages; 281 illustrations. Philadelphia: Lea Brothers & Co., 1885. Price, cloth, $2.25.

This book, as we are informed in the preface, was written with the object of supplying the student with directions for the microscopical examination of the tissues, and to serve as an elementary text-book of histology. For conveniently accompanying the work of a class of medical students, the book is divided into forty-two lessons. Only those methods are recommended which long experience has proved can be fully depended upon. The author is well and favorably known as the editor of the histological portion of "Quain's Anatomy," which fact is a guarantee of the practical character of the volume. The lessons, beginning with an enumeration of the tissues, and the general structure of animal cells, include the use of the microscope, the study of human and other blood-corpuscles; the action of reagents, and the characteristic structural features of all the tissues. The plan of the book makes it well adapted for a text-book. It comprises all the essential facts of the science of histology. Chapter XXVI is largely devoted to the histology and development of the teeth. The work, though very much condensed, has been creditably done. The illustrations of the minute anatomy of the teeth are of the orthodox kind which have appeared in most works on histology during the past twenty-five years. An error appears in Fig. 150, representing a vertical section of a tooth *in situ*. The fibers of the periosteum or pericementum are running in the wrong direction. The drawings illustrating the development of the teeth are much above the average of works on general histology.

The author says in the text that "the teeth are developed in the same manner as hairs." This is not correct. He should have said in a similar manner. There are important differences in the development of hair and teeth. Figs. 156 and 157 present, we believe, the first authoritative confirmation of the views held by Dr. J. L. Williams of the structure and morphology of the enamel-organ and the odontoblasts. The odontoblasts are represented as oblong, nucleated cells, from which arise the dentinal fibrillæ, several of these processes sometimes arising from a single odontoblast. The odontoblasts are also correctly represented as sending processes backward into and connected with the reticulum of the pulp.

A Text-book of Medical Chemistry. For Medical and Pharmaceutical Students and Practitioners. By Elias H. Bartley, M.D., professor of chemistry, etc. With forty illustrations. Philadelphia: P. Blakiston, Son & Co., 1885. Price, cloth, $2.50.

As stated in the preface, "this book is designed especially as a text-book for medical students during their attendance upon lectures." It will commend itself to the student for the reason that, while very comprehensive in its scope, the concise and clear manner in which the various descriptions of individual substances and statements of general principles, together with the relations of the facts of the science to medicine, are presented make it a work which affords a real pleasure to study, especially to those who have labored with the more voluminous works on the subject. It is fully up to the present state of the science. Part I is devoted to a presentation of the more important fundamental facts in chemical physics necessary to a proper understanding of the use of the thermometer, spectroscope, medical batteries, etc. Part II is a concise section on theoretical chemistry, including notation, nomenclature, chemical reactions, and stoichiometry. In Part III the natural history of the elements and principal compounds with their physiological and toxicological bearings are presented, and Part IV is devoted to a study of such of the organic compounds as the physician is likely to meet with. Tables of weights and measures, specific gravities, solubilities, etc., and a glossary of unusual chemical terms are added in the appendix.

Though written especially for the college student, it should fill an important place in the library of the practitioner of both medicine and dentistry, being full of just such information as he is in almost daily need of, in a form more readily accessible than in any similar work we are aware of.

The distinguishing features of the book are its clear and concise style, and the compact arrangement of its matter, with an entire

absence of everything superfluous to the needs of the student,—qualities which must commend it as a text-book. In view of the vast accumulation of chemical facts, it is surprising to what extent they have been condensed in the present volume without a sacrifice of clearness of expression or matter.—E. C. K.

Applied Medical Chemistry. A Manual for Students and Practitioners of Medicine. By Lawrence Wolff, M.D., demonstrator of chemistry, Jefferson Medical College, etc. Octavo, pp. 167 and index. Philadelphia: P. Blakiston, Son & Co., 1885. Price, cloth, $1.50.

This is a hand-book of chemistry as applied to medicine, and includes the chemistry of poisons with the means for their detection and estimation, together with the apparatus and reagents necessary for that purpose, as well as a sufficiently full description of the method of using them. A section is devoted also to an investigation of the substances composing animal structures, and those which are capable of being elaborated into them, together with the chemistry of the secretions and excretions. The last section treats of sanitary chemistry, including food adulterations.

The book places in the hands of the practitioner a full and reliable guide in testing for the various substances used as poisons and food adulterants, as well as a complete method for analysis, both qualitative and quantitative, of the urine and of vesical calculi.

An admirable addition to the work are the syllabi appended to each chapter, which are intented as practical exercises for the student, by which the facts taught are more definitely fixed upon the mind.

Though intended for the student, the work will undoubtedly be welcomed by the physician or specialist whose calling necessitates the frequent answering of questions bearing upon pathological conditions of the urine, medical chemistry, and toxicology, or the investigation of the purity of foods. The behavior with reagents of all the substances having any bearing on the above subjects is fully stated, which renders it valuable as a work of reference.—E. C. K.

A System of Practical Medicine. By American Authors. Edited by William Pepper, M.D., LL.D., assisted by Louis Starr, M.D. Volume III.—Diseases of the Respiratory, Circulatory, and Hæmatopoietic Systems. Imperial octavo, pp. 1032. Philadelphia: Lea Brothers & Co., 1885. For sale by subscription only; price, cloth, $5.00; leather, $6.00; half Russia, raised bands and open back, $7.00.

In previous numbers of the Dental Cosmos we have noticed the

first and second volumes of this "System of Medicine," and the commendation to which they were considered justly entitled seems to be equally deserved by the volume before us. The same clear, terse, and comprehensive treatment of the various topics is apparent and noteworthy.

A list of the contributors alone is sufficient to indicate the character of the essays: Drs. D. Hayes Agnew, Harrison Allen, Edmondson T. Atkinson, Edward T. Bruen, Samuel C. Bussey, William Carson, Samuel C. Chew, Elbridge G. Cutler, J. M. Da Costa, N. S. Davis, Frank Donaldson, Louis Elsberg, Austin Flint, G. M. Garland, W. H. Giddings, Abraham Jacobi, Hosmer Johnson, George M. Lefferts, Morris Longstreth, Alfred L. Loomis, John S. Lynch, William Osler, William Pepper, John B. Roberts, Beverly Robinson, Carl Seiler, and Andrew H. Smith. The contents of this volume are Diseases of the Respiratory System, of the Circulatory System, of the Blood, and of the Hæmatopoietic System.

Milk Analysis and Infant Feeding. A Practical Treatise on the Examination of Human and Cows' Milk, Cream, Condensed Milk, etc., and Directions as to the Diet of Young Infants. By Arthur V. Meigs, M.D., physician to the Pennsylvania Hospital, etc. 12 mo, 102 pp. Philadelphia: P. Blakiston, Son & Co., 1885. Price, cloth, $1.00.

The author, in his introduction to the volume, quotes from the mortality statistics of the United States the startling figures 175,266 as the number of children under one year of age who died in the census year of 1880, and from the *Public Ledger* the statement that "more than one-quarter of the total number of deaths that took place in the city of Philadelphia in the year 1883 was of children under one year of age."

These figures indicate the necessity for the dissemination of knowledge which may lessen infant mortality. It is certain that a very large proportion of the deaths of infants under two years of age is from nutritional disorders, and that many of them are avoidable. Any methodical consideration of the subject which tends toward more positive conclusions regarding the composition of human milk, and the best substitutes for it, should be heartily welcomed. The method of analysis and the comparison of human and cows' milk are carefully stated, the author considering the results as satisfactorily demonstrating that human milk contains only about one per cent. of casein. The artificial feeding of infants is then discussed, from the stand-point of a proper understanding of the composition of human milk, its proximate constituents, and the proportions in which they exist, in order to an intelligent effort to

determine how the same elements may be had and mixed so as to make an artificial food which shall approximate it in its essential qualities. The work is a substantial contribution to the literature of the subject, and is commended to the study of all concerned in the solution of the vexed problem of infant feeding.

Quiz Questions: Course on Dental Pathology and Therapeutics, Philadelphia Dental College. By Prof. J. Foster Flagg, D.D.S. Answered by William C. Foulks, D.D.S., formerly demonstrator and instructor in the Philadelphia Dental College. Third edition, revised and enlarged. 12 mo, 129 pp. Philadelphia: The S. S. White Dental Mfg. Co., 1885. Price, cloth, $2.00.

The necessity for a third edition of this work shows that it has been well received. It has been revised and enlarged, and is bound with alternate leaves blank, for the convenient entry of memoranda in connection with the subjects on the opposite pages. The volume contains in a condensed and practical form the general facts and principles of dental pathology and therapeutics as taught by Prof. Flagg. The systematic arrangement of subjects, and the terse presentation of theory and practice in the form of question and answer, make it convenient as a work of reference in office practice, and useful to the student as a *résumé* of essential points in a college course. There are few who would fail to find more than the price of the book in its pages.

Tabulæ Anatomicæ Osteologiæ. Editæ a Carolo H. von Klein, Artium Magistro Medicinarum Doctore. Editio Emendata. Cincinnati, O., U. S. A. Cincinnati Lithographic Co., 1885.

This volume consists of illustrations of the bones composing the human skeleton, and, in minute detail, the Latin nomenclature. This is the one distinguishing feature of the volume—the presentation of the technology, in order, as the author says, that "medicine may have a uniform language in every quarter of the globe." For the purpose of enabling one to refer readily to the designation in Latin of any anatomical point, the book would prove convenient.

The Scientific Adaptation of Artificial Dentures. By C. H. Land. Detroit: Published by C. H. Land, 1885.

This is a little volume of forty-four pages, giving in fourteen chapters brief instruction on the principles of adapting artificial dentures to the mouth. Sixteen pages are devoted to hints for the laboratory.

Pamphlets Received.

Letters from a Mother to a Mother on the Formation, Growth, and Care of the Teeth. By the Wife of a Dentist, "Mrs. M. W. J.," hon-

orary member Southern Dental Association, etc. Copyrighted, 1883. Third edition, revised and enlarged. Philadelphia: Welch Dental Co., 1885. Price, paper, 25 cents.

Address of the State Board of Health and Vital Statistics of the Commonwealth of Pennsylvania to the People of Pennsylvania. Harrisburg: E. K. Meyers, State printer, 1885.

Transactions of the Michigan Dental Association, Twenty-Ninth and Thirtieth Annual Sessions, 1884 and 1885. Published by the Association. Detroit: Wm. Graham, printer, 1885.

Tracts on Massage. No. II: The Physiological Effects of Massage. Translated from the German of Reibmayr, with Notes, by Benjamin Lee, A.M., M.D., Ph. D. Philadelphia, 1885. Price, flexible cover, 25 cents.

Abnormal Positions of the Head: What do they Indicate? By Edward Borck, A.M., M.D., professor of surgery, etc. St. Louis, Mo., 1885. Reprint from the *Medical and Surgical Reporter*, Philadelphia, Pa.

The Therapeutics of High Temperatures in Young Children. By William Perry Watson, A.M., M.D., Jersey City, N. J., assistant to the chair of diseases of children in the New York Polyclinic. Reprinted from the "Archives of Pediatrics," September, 1884. Philadelphia: John E. Potter & Co., 1885.

OBITUARY.

ALFRED WRIGHT, L.D.S.—JOHN H. SAMUEL, L.D.S.

ALFRED WRIGHT, L.D.S., Montreal, Canada, aged thirty-one years.
JOHN H. SAMUEL, L.D.S., Montreal, Canada, aged twenty-five years.

Within a few days of each other two of the most promising young Canadian dentists were carried off by unnatural deaths.

Dr. Wright, nephew and once a student of Dr. Chas. Brewster, of Montreal, had been in the habit for several years of inhaling chloroform to relieve pain. On Tuesday afternoon, the 24th September, he went to his room, and as usual locked the door and told the housekeeper not to disturb him. On Thursday the woman sent in for his neighbor, Dr. Beers. The door was broken open, and Dr. Wright was found dead, with the cone close to his face, having been dead two days. He was a very quiet, worthy confrère, and had a large circle of friends in athletic and boating clubs.

Dr. Samuel's death was even sadder. During the small-pox epi-

demic the Victoria Rifle Volunteers, of which he was a member, were on guard of the grounds where the civic hospital was being erected. A mob of French Canadians had threatened to assail and destroy the place, and word was sent to the sentries, of whom Dr. Samuel was one, to have ball cartridges ready, but not to load. The order was misunderstood by a few of the younger soldiers, and one of them when withdrawing the cartridge let his thumb slip. The rifle went off, and the ball, striking the ground first, rebounded and struck Dr. Samuel in the back. He lived about seven hours. Dr. Samuel was for three years a student of Dr. Beers, of Montreal; was then assistant to Dr. E. A. Bogue, of New York, for two years, and, after being associated for one year with Dr. Beers on his return to Montreal, began business for himself, and distinguished himself as one of the most successful young practitioners. He was buried with military honors.

The dentists of Montreal turned out as a body at the funerals of both confrères, and sent beautiful floral wreaths. The loss professionally, and to many of us personally, is one not easily replaced. —W. G. B.

PERISCOPE.

Cocaïne in Dental Surgery.—Having read with interest the reports which have appeared week after week of the various uses to which cocaïne has been put, I thought a few particulars of my experiments with it in dental surgery might be interesting.

For extraction I have tried both the solution and the hydrochlorate of cocaïne itself, and with the latter have obtained very satisfactory results. It seems to answer best for front teeth and bicuspids; also for stumps when separate. The following case will show the method adopted, etc.:

R. W., a porter, aged 20, came to the Dental Hospital to be relieved of a lower right second bicuspid, which was above the average size and quite firm. I first surrounded the tooth and about half an inch of the gum around it with the corner of a napkin, to keep the parts dry and prevent the cocaïne from being carried off in the saliva. I then freely applied the crystals to the gum close around the tooth three times, at intervals of two minutes each. After the second application, the gum was entirely anesthetized, the patient not feeling the pricks of a sharp probe. A few seconds after the third application, with a pair of warm forceps, which I carefully hid from view, I extracted the tooth, and said nothing for some time. At last I desired the patient to wash out his mouth, but he began to smile, saying the tooth was not out; nor would he believe that it was until he had felt the empty socket with his finger.

With large teeth I have found it a good plan to treat as above, and then, just before extracting, to introduce the nozzle of a fine hypodermic syringe between the gum and neck of the tooth, and

inject three or four minims of the 4 per cent. solution. This may not, however, be possible in all cases.

With molar teeth, more especially upper, although the pain is greatly diminished, there is always the twinge of the actual separation of the tooth from its socket, and the rupture of the nerves, etc., at the apices of its roots.

In all the cases I have seen the gum has returned to its normal state in a short time, and there has been no unfavorable symptoms of any kind, although I have carefully watched for them, both locally and otherwise. As an obtundent for sensitive dentine, the 20 per cent. solution has proved, so far, very effectual. By applying it on a pellet of cotton-wool for a short time, I have been enabled to proceed with the preparation of a cavity for filling which before has caused the patient the most acute pain; and a solution of this strength will, I think, be found of great advantage in cavities in close proximity to the nerve, or even in operations on the nerve itself.—*J. McKno Ackland, M.R.C.S., in British Med. Jour.*

Phosphorus Necrosis of the Jaws.—Dr. J. Ewing Mears, of Philadelphia, read a paper on this subject, which closed with the following conclusions: 1. That the disease was a local expression of the constitutional condition produced by the inhalation of the vapor of phosphorus, and by particles of the agent taken into the system with the food by operatives in match factories who did not give proper attention to cleanliness of the hands. 2. That the introduction of the agent into the system was, as a rule, very gradual, and in such small quantities as to avoid the production of symptoms of acute poisoning; that in this way the chronic toxic condition of the system was induced, characterized chiefly by disintegration of the red-blood corpuscles and fatty degeneration of the arterial coats. 3. That the toxic condition preceded the jaw disease, as was shown by the fact that the disease did not attack operatives recently exposed to the action of the agent, but those who had been exposed for a period of years. 4. That examination of the teeth of operatives had shown that many who had caries, and had returned to work immediately after the extraction of teeth, had enjoyed immunity from the disease, showing that the agent had not attacked the periosteal tissue thus exposed. This was further shown by the fact that in one of the cases necrosis did not appear until three months after labor in the factory had ceased. 5. That individuals varied in their susceptibility to the action of the poison; for this reason many suffered immediately with acute symptoms, such as nausea, vomiting, etc., and were compelled to abandon work in the factories. 6. That the conditions under which experiments had been made on animals, to prove the absence of the disease until exposure of the periosteum and peri-alveolar tissue was effected, were not similar to those to which operatives in match factories were subjected. 7. That treatment of the disease in the primary stage was efficient and prevented its progress. 8. That the antidotal powers of turpentine had been established. 9. That the disease was to be prevented among operatives by the adoption of thorough methods of ventilation, stringent rules with regard to cleanliness, and the free disengagement of the vapor of turpentine in all the apartments of factories in which the

fumes of phosphorus escaped.—*Report American Surgical Association, in N. Y. Med. Journal.*

SALIVARY CALCULUS IN A MEDICAL MAN.—Dr. de Rato y Roces describes in the *Revista Asturiana de Ciencias Médicas* his own case of salivary calculus. When a child the sublingual glands were indurated and painful; afterwards that on the right side disappeared, but the left gland continued to cause trouble, the pain being felt in Wharton's duct, and there being increased secretion of viscid saliva. These symptoms, however, disappeared for a time. For several years, especially during the later months, pain and inflammation have returned, sometimes extending to the right side. After the acute symptoms have subsided a permanent induration has always remained. Last December Dr. de Rato suffered from a more severe attack of this kind than usual, accompanied by repeated rigors, followed by severe pain and febrile disturbance. Afterwards the inflammation extended, and glossitis and amygdalitis prevented speech and the ingestion of food; then came a copious secretion of viscid saliva. By the fifth day, when the inflammation had to some extent subsided, a probe passed into Wharton's duct detected a calculus, which was extracted by forceps the following day. It was of the shape of a date-stone, weighed 540 milligrammes (8·37 gr.), and was of the hardness of chalk. Externally it was of a dirty white color with reddish spots, and internally it was white. Since the extraction of the calculus the induration remains, and Dr. de Rato believes there are also small calculi in the duct.—*The Lancet.*

SALIVARY CALCULUS OF STENO'S DUCT.—Dr. E. C. Seguin presented a specimen obtained from a gentleman who was under treatment for specific hemiplegia. He was now in good general health; but a few days ago, without any apparent cause, the cheek began to swell in front of the parotid gland, and there was also swelling to be seen about the orifice of Steno's duct, from which a profuse amount of mucous fluid escaped. The next morning the patient found the calculus presented lying between the cheek and jaw, and the duct was diminished in size. A few years ago Dr. Seguin met with a similar case of calculus of Wharton's duct in a lady of gouty diathesis. There was swelling and an abnormal tenderness, and on introducing the probe into Wharton's duct it came in contact with a hard substance. Within a few days the calculus was thrown out spontaneously, as in the case just related. It seemed somewhat remarkable that there could be spontaneous extrusion of calculi of so large size.—*Proceedings N. Y. Pathological Society, in Phila. Med. Times.*

FATTY INJECTIONS IN SALIVARY FISTULA.—In the *Abeille Médicale*, No. 51, 1884, M. Mollière, of Lyons, reports a case of salivary fistula cured by a novel procedure. At the age of six years, when suffering from measles, a painful swelling appeared beneath the ear of a girl, which was incised, and gave vent to saliva, the flow being increased during mastication and by stimulating articles of food. Ten years subsequently an unsuccessful attempt was made to close the opening by a plastic operation; and, a year later, when the patient came under

the charge of Mollière, there was a small opening below and in front of the lobule of the ear, which communicated with a small duct given off by one of the lobules of the parotid gland. Acting upon an experiment of Claude Bernard, who succeeded in destroying the secretory elements of the pancreas by injecting an oleaginous substance into the canal of Wirsungius, Mollière threw into the fistula about eight drops of carbolized oil, without any apparent effect. Upon repeating the operation, however, six weeks subsequently, the affected lobule atrophied, and the fistula closed spontaneously. As the parotid gland is not essential to life, Mollière recommends a resort to fatty injections in all cases of salivary fistulæ of the duct of Steno which have proved rebellious to other measures.—*Med. News.*

Easy Cure for Salivary Fistula.—The following method does not appear to be mentioned in any of the usual text-books of surgery: J. K., a fish salesman, came to me about the New Year with a fistula of the parotid duct resulting from a former knife-wound. The flow of saliva was continuous, but was much aggravated at meals and when opening oysters in the course of his business. Applications of nitrate of silver, pure nitric acid, and a hot wire were tried without success, as all communication with the mouth seemed shut off. On January 20 two needles threaded on one fairly strong piece of silk were successively passed through the fistula into the mouth, on a rather lower level than the external fistulous orifice, piercing the buccal mucous membrane about a quarter of an inch apart. The needles were then removed, and the threads firmly tied and cut off short, thus leaving a ligature inclosing part of the internal wall of the duct, a portion of mucous membrane, and the intervening structures, but in no way preventing the healing of the external wound, as would be done by the seton usually recommended. The edges of the fistula were touched with pure nitric acid on January 22, and some swelling of the side of the face ensued. On January 25 a scab had formed outside, and nearly all the saliva found its way into the mouth. This scab came off a few days later, leaving the skin soundly healed, and the ligature inside cut its way through the mucous membrane on February 11, since which time the man has experienced nothing differing from the normal condition.—*Alfred Hodgson, M. B. Aber.*, in *The Lancet.*

HINTS AND QUERIES.

A Case of Transplantation.—In the "Periscope" of the September number of the Dental Cosmos a remarkable case of re-implantation of a tooth is reported, in which a tooth was replaced seventeen hours after being forced out. I know of a case in which a lower molar was replanted ten days after it was extracted, and has proved a success. I now wish to report a case of transplantation. Annie R., twelve years of age, was brought to me by her mother, on the 2d of October, 1880, with the left superior lateral incisor broken off; the root hopelessly decayed, badly ulcerated, and fistulous; altogether beyond the possibility of being put in a condition to support a grafted crown of any description. As I considered her too young to wear a plate, I determined on transplantation, if I could find a

tooth that would at all suit the case. I happily found a tooth, which I recognized as one that I had extracted six months previously,—a fair match in size and color, sound and dry, but the root a little too long. The diseased root was extracted, and an appointment made for the patient the following day. The root of the selected tooth was then shortened, and rounded off with a file; the nerve canal opened from the apex, cleansed, and filled with oxychloride of zinc, and completed at the apex with cohesive gold. A strip of platinum plate was then bent over the cutting-edge of the tooth, and burnished to fit the labial and lingual surfaces, terminating at both ends in sharp points at the original line of the gum. A bit of silver wire was provided and laid aside with this platinum stirrup, and the tooth placed in a vessel of glycerin to await the patient. But an almost incessant November rain kept her away until the twelfth day after the root had been extracted. The socket was found to be rapidly filling with healthy granulations, which were removed with one dextrous sweep of the lancet, and mopped out with a mixture of carbolic acid and turpentine. The tooth, which had been allowed to stand ten or fifteen minutes in warm water, was now placed in position and pressed up firmly into the socket. The silver wire was passed around this and the two adjacent teeth near the gum, and the ends twisted together with pliers until tight. The platinum stirrup was placed over the crown and the pointed ends bent outwards over the wire, which held the tooth perfectly firm. An aperient was directed for three succeeding mornings, and aconite and iodine to be painted on the gums in case of inflammation. There was no inflammation, and the patient did not complain of any pain. To make assurance doubly sure, the stirrup bandage was not removed for three months, when the tooth was found to be perfectly firm and solid, the gum pink and healthy, and it has remained so to this day. It will be five years the third of November, 1885. I have had several dentists examine the tooth, and they expressed the opinion that it would be as difficult to extract as any incisor in the mouth.—J. L. MEWBORN, D.D.S., *Memphis*.

A CASE OF RE-IMPLANTATION.—In June, 1878, a young man, Mr. B., of robust constitution, came to me at six o'clock in the evening, accompanied by his mother, who reported that two hours previously her son had had the two upper central incisors knocked out by a fall from his horse. The horse had fallen first, and the rider struck the knee of the horse in such a manner as to knock out the two teeth, which were found on the ground a half hour later. In examining his mouth I found the alveolus fractured externally, the blow having been from within outwards. The maxillary was split between the right cuspid and the right lateral incisor. Since the accident he had had continuous but slight pain, increasing much when we sought to separate the lateral incisor from the cuspid.

M. Guillermin, whose assistant I was, arrived at this moment, and we decided to attempt replacement of the teeth. Success appeared to us very doubtful, as the teeth were dry, having been picked from the sand and afterwards carried in the vest pocket. We sawed off the extremities of the roots for a length of two millimeters, and placed them in lukewarm water for a quarter of an hour. We then took an impression of the mouth, and in half an hour I made an apparatus of gutta-percha strengthened by platinum wire, leaving the necessary space for the two incisors; during which time M. Guillermin replaced the teeth in the mouth and held them with his fingers. After placing the apparatus in position, we dismissed our patient, recommending him to diet for two or three days on soups and milk. Repeated applications of an aqueous solution of chlorate of potassa was the only other recommendation made to him.

Five days later the teeth had acquired a decided firmness, and in ten days they were perfectly solid. There was no suppuration. The reunion was made by first intention. Seven years have elapsed, and the teeth have retained their normal color, and have not changed in position.—L. Roussy, *Geneva*, *Switzerland.*

Should Air-Chambers be Used in Artificial Dentures?—I take the negative, for two very important reasons. First, an air-chamber causes a large protuberance in the mouth, which in many instances produces a very unpleasant sensation to the wearers of plates constructed in that manner. Second, so much thickness is added to the plate that it often makes it quite difficult to articulate plainly, especially where the roof is flat. The proof of the uselessness of the air-chamber can be made by the dentist. If, after he finds that the plate fits the patient's mouth perfectly, he removes the plate and fills the air-chamber with plaster of Paris or wax, upon again inserting the plate he will find just as good adhesion as before the chamber had been filled. All of us have seen plates with the soft tissues completely filling the air-chamber, and the artificial denture holding as firmly without the vacuum as when the plate was first inserted. In thirty years' practice, in which time I have constructed over 3,200 upper sets, not one of them has an air-chamber. The great secret in making a suction-plate is to keep the air from entering at the *heel* of the plate. If the palatine arch is soft, I make four or five grooves or marks across the heel of the cast, from one condyle to the other, say one-sixteenth of an inch apart. If the palate is hard, I do not cross the ridges over it, but make them quite deep each side of it,—that is say, about one-sixty-fourth of an inch. If the plate bears too hard on any one part, I pare off a little. In conclusion, I am happy to say that all of my patients still retain natural, healthy mouths, instead of deformed and spongy ones.—Stephen Lee, *Pawtucket*, *R. I.*

Curious Case of Epistaxis Resulting from an Abscessed Tooth.—A lady of full habit, about forty-five years of age, recently presented herself to me for the extraction of the right superior lateral incisor. Her face in the immediate vicinity of the tooth was considerably swollen, with intense pain. For several days previous she had had, at intervals, a severe hemorrhage from the right nostril. After removing the tooth, there was some discharge of pus and blood from the socket, and also a profuse hemorrhage from the nose, that soon subsided and has not since occurred.—H. E. Johnson, D.D.S., *North Attleboro*, *Mass.*

Engine Brush.—Some months since I devised and used a small brush in the dental engine, and suggested the manufacture of them to The S. S. White Dental Manufacturing Co. for the benefit of the profession. I have found them exceedingly useful in cleaning teeth and finishing fillings. A special use to which I call attention is as follows: Take equal parts of tincture of iodine and glycerin; while the engine is in motion saturate the brush; then apply to a stained tooth. By this means the iodine is not spread over the gums or lips, as is apt to be the case when used in any other manner. Then follow with fine pumice. I think anyone so using this little device will be gratified with the result.—J. W. Lyder.

A Practical Hint.—Your readers may be interested to know of a useful substitute for the ordinary slab on which oxyphosphate and other stoppings are mixed. It is a two-inch cubic block of glass, with beveled edges, usually sold as a letter-weight. Its advantages are obvious,—always a firm grip on your block, and six sides for mixing instead of two. To clean quickly, rub the surfaces of two blocks together, using a little fine sand and water.—George Pedley, *London*, *Eng.*

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ORIGINAL COMMUNICATIONS.

THE MERITS AND CLAIMS OF ARTIFICIAL CROWN AND BRIDGE-WORK.

BY J. L. WILLIAMS, D.D.S., PHILADELPHIA, PA.

[Third Paper.]

A former paper upon this subject written, nearly two years ago, closed with these words: "As the introduction of the cheaper forms of artificial dentures was the inauguration of an era which has been prolific of evils that may not be remedied in one generation, and which, by degrading the prosthetic element in dentistry, has tended to destroy public appreciation of all efforts which demand a price in proportion to the skill and art displayed; therefore, the introduction of any improvement which will tend to elevate the standard of dentistry by securing to the patient a form of denture which shall be more compatible with nature's laws, and to the dentist a more equitable compensation for his services, should receive the hearty indorsement of every progressive man in the profession."

While I have received, since the appearance of the former paper referred to, hundreds of earnest letters of inquiry from members of the profession concerning this work, yet I am sure it has not received, at the hands of many leading men, that recognition which its merits demand. I cannot but believe that the work has outlived every objection which has been made against it, and demonstrated that, in the hands of those who can and will handle it in a skillful and judicious manner, it is one of the most valuable phases of the practice of modern dentistry. I am well aware that the possibilities for abuse in this work are great. Skill, good judgment, and keen perception of pathological conditions are necessary to the highest degree of success. The failure which may follow the non-observance of these

conditions will be greater or less in proportion to the magnitude of the operation attempted.

The work may also have been in many instances so constructed that it was not possible for the patient to keep it perfectly clean, and an offensive condition of the mouth has resulted. What I am disposed to criticise in the remarks sometimes made by members of the profession in good standing is, not their condemnation of particular cases of this work,—for in those cases I should undoubtedly be in full agreement with them,—but their indiscriminate condemnation of the *principles* of the work. But men are too often creatures who act from preconceived notions and stubbornly adhere to opinions formed without mature thought or careful examination of premises. The work is sometimes condemned as uncleanly when the fault is wholly with the patient wearing it. This is rarely if ever taken into consideration by those who are disposed to pass hasty judgment. The dentist who should say, on examining a mouth full of natural teeth which were in a filthy condition because of neglect on the part of the patient, "That is not a desirable condition for the mouth to be in, and the best way to overcome the difficulty is to extract the teeth," would be just as reasonable as another who would say on examining an extensive piece of bridge-work which the patient had neglected to keep clean, "That is a filthy thing to have in one's mouth, and the only way out of the difficulty is to remove it and substitute a plate for it." I have heard men make this statement without even asking the patient a question; not knowing whether they understood how to properly use a brush or whether they ever attempted to use one. Unless one possesses the spirit of a philosopher, he is likely to lose patience with men who will make such unreasonable assertions. I have even heard dentists remark, on looking into the mouths of patients containing this work which was kept scrupulously clean, "Oh, yes, that looks well now, but it will get filthy after a time;" as though a condition of cleanliness which had been kept up for a year or two years, as the case might have been, could not be maintained for an indefinite length of time.

A criticism which I not infrequently hear passed upon the work is, that the pulpless roots upon which bridge-work is sometimes fastened may successfully support it for a time, but will eventually become the source of trouble. There are several replies which might be made to this criticism. We frequently meet with pulpless teeth in a healthy condition, and upon inquiry we find that the pulps have been removed ten or fifteen years. Why does not the treatment of pulpless teeth always result in this satisfactory manner? In ninety-nine per cent. of the failures it is because the conditions necessary to long-continued health of a pulpless root were not ob-

served in its treatment prior to and while being filled. Crown or bridge-work should never be placed upon roots which cannot be brought into a healthy condition. But every dentist of reputation knows that thousands of pulpless teeth and roots are almost daily sacrificed which might have been restored to a state of health. A *dead* tooth or root should never be permitted to remain in the jaws,—nature will not long allow it to remain there,—but there is no little misapprehension concerning what constitutes a *dead* tooth. Knowing the extent of this misapprehension, both in the medical and dental professions, I devoted considerable space in my former papers upon this subject to demonstrating, both by the histological arrangement of the parts and analogical reasoning, that not only is a pulpless tooth not necessarily a dead tooth, but that when the pulp of a tooth is removed in a true surgical manner, as it may nearly always be, and the pulpless root is properly treated, *the condition of that portion which is in contact with its investing pericementum remains unchanged.* The various pathological manifestations which have followed the attempt to retain pulpless teeth and roots in the jaws are not to be regarded as in any sense consequent upon the loss of the pulp, but as the result of dead, putrescent, septic matter which is confined within the tooth, and which becomes an irritant to the living tissue with which it comes in contact. So important is this point to be considered, that attention must be called to it again and again in order that its full significance may be realized. I am well aware that many eminent practitioners openly discourage the attempt to remove all of the devitalized portions of the pulp from the terminal parts of the root-canals; and I have no doubt the system of treatment which they advocate and practice is successful for the time. But I am also certain that danger lies in ambush around the ends of roots so treated. If the health of the individual is maintained, such roots may remain for many years without annoyance. But if the combined forces of the systemic life become weakened, a condition usually spoken of as one of low vitality, then the parts become much more sensitive to anything of an irritant nature, and the patient becomes conscious of a sense of uneasiness in the region of the pulpless tooth, and a more or less grave pathological condition may follow, or symptoms of an obscure nature may be manifested. Perfect safety lies only in the complete removal of all subtances that may become a source of irritation, and a perfect closure of the foraminal opening in the end of the root; and when that is accomplished I believe the danger of future trouble about the roots of pulpless teeth is not greater than that attending the perfect healing which follows any other minor surgical operation.*

* When from curvature of the root or narrowness of the pulp-canal it becomes

Knowing that the value of these artificial substitutes for the natural teeth is entirely dependent upon the conservation of the teeth or roots upon which they are mounted, and believing that the methods of treating these roots which have been worked out in connection with the system known as crown and bridge-work are superior to those practiced by the majority of the profession, I am disposed to devote considerable space to this part of my subject. Before describing the several modifications of bridge-work illustrated in this article, I desire to call attention to a few of the cases which I have treated, and which are more or less radical departures from those ordinarily met with.

Case I. This case was reported in the *Independent Practitioner* for April, 1884, from which I quote as follows: "Mrs. S. had been wearing a pivot-tooth on the root of the upper right central for several years, and as it required frequent resetting she desired to have it replaced by a more permanent operation. On removing the crown the root was found in a bad condition. Decay had penetrated the side of the root, leaving quite a large opening into the pericementum. An enlarged foraminal opening led to a cavity at the end of the root, from which an offensive pus was discharged. But the root was very firm, and promised to give a secure foundation for a crown if it could be brought into a healthy condition. A little cowardice prompted me to attempt the treatment through the root, but after a week's effort my ambition in that direction was satisfied, and I resorted to a method which has proved eminently successful in several cases of this character. The end of a soft, smooth broach was bent so as to form a little hook. This was passed up the enlarged pulp-canal until the hook slipped over the end of the root. The broach was then seized with pliers at a point exactly opposite the external end of the root and drawn out, and the length carefully measured.

"A point of orange-wood was carefully shaped to fit the pulp-canal, a notch cut on one side, showing the exact length of the root inside, and after dipping in a solution composed of equal parts of carbolic acid, chloral hydrate, and gum camphor, it was driven into the canal until the notch appeared precisely opposite the end of the root. I know of no other method by which an enlarged pulp-canal can be so perfectly filled, with a certainty that the filling-material has gone exactly to the end of the root and no further.

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impossible to follow it its entire length, the canal can probably be most perfectly and safely closed by filling the root canal, as far as it has been opened, with a solution of gutta-percha in chloroform, to which have been added a few drops of a solution of iodoform in eucalyptus oil. After carefully pumping this solution into the canals, insert a wood point previously prepared and drive it gently to place.

"The wood point was twisted off at a point about half the length of the root, where it had been weakened by passing a knife around it, cutting partly through. Heavy gold foil was placed over the opening in the side of the root, and the large funnel-shaped opening filled with amalgam. An external opening was made opposite the end of the root, and the diseased bone and end of the root cut away with rose-burs. A cotton tent was kept in for two days. On the third day a crown was placed on the root, and in ten days the external opening healed and all irritation had passed away."

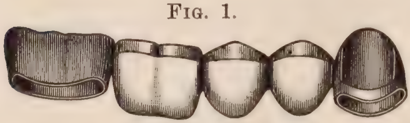
Case II. Mr. W. had a central incisor broken near the margin of the gum by a base-ball. The pulp was removed and the canal filled with gutta-percha. Inflammation followed and an abscess threatened, which was prevented by removing the filling. When he came to me the canal had been open for more than a year, and from it there had been more or less constant discharge. On examination I found it filled with black and very offensive matter, which had stained the dentine to a considerable depth. After syringing with warm water, I enlarged the canal materially and passed directly through the end of the root with a rose-bur. I enlarged the cavity which I found at the end of the root until I had produced quite a copious flow of blood through the canal. After the bleeding had ceased a broach wound with cotton was dipped in chloride of zinc, 20 per cent. solution, and passed up through the root. After this treatment the canal was simply dressed with Listerine for ten days, the dressing being changed every day. At the end of that time, there being no discharge (in fact, I could not discover at any time after the operation that there was any discharge of pus), the root was filled precisely as described in the preceding case, and a Richmond crown mounted upon it.

I believe the most rational treatment for that persistent pathological condition which remains around the roots of teeth which have been the seat of alveolar abscess may be summarized in a single short sentence. If the source of the primary irritation remains, remove it; cleanse the root thoroughly and fill it; then *reduce the territory of perverted physiological action to the condition of a simple wound, and treat it as such.* If the case is one of long standing, I enlarge the external opening and enter the cavity at the end of the root with a large rose-bur, cutting out the walls of the cavity and trimming the end of the root. Syringe out with warm water; inject a ten per cent. solution of chloride of zinc, and insert a cotton tent for a few days. Dress the wound—for this is what you now have—daily, syringing with peroxide of hydrogen, followed by Listerine. I believe this simple treatment will cure the most persistent cases of abscess, or, more properly speaking, alveolar ulcers, in from

ten days to two weeks. The medication of these ulcerated tracts for many weeks and sometimes months is neither humane nor scientific treatment.

While I have thus written encouragingly of the practice of retaining pulpless teeth in the jaws, I would always *dis*courage the removal of healthy pulps, except when absolutely necessary. But the operator should not hesitate to do this when convinced that the patient will be greatly benefited by the insertion of a piece of work which necessitates the removal of a healthy pulp. However, the constant modifications and improvements in the methods of constructing the work is making the removal of pulps more and more unnecessary.

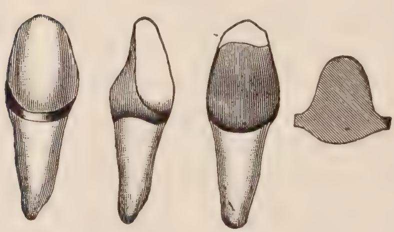
Fig. 1.



We will now proceed to consider the principal object of this paper, which is the illustration and description of some of these improvements.

Fig. 1 shows a piece of work made for a case of quite frequent occurrence. It represents the restoration of the inferior bicuspids and first molar of the right side. A gold crown is made for the second molar, and then the three intervening teeth or "dummies" are made as described in my former paper. For the support of the anterior end of the bridge the method hitherto practiced has been to excise the crown of the cuspid and fit a porcelain crown with gold backing to the root, and to this the anterior end of the bridge is soldered.

Fig. 2.



a. *b.* *c.* *d.*

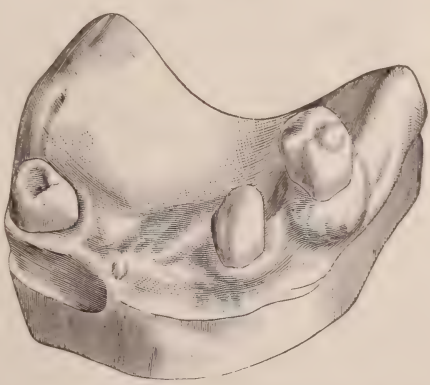
Fig. 2 illustrates a device which obviates the necessity for removing the cuspid crown. A gold band is fitted around the cuspid. At the front, shown at *a*, Fig. 2, this band is allowed to pass a little beneath the margin of the gum so as to make the smallest possible exhibition of gold. On the lingual aspect of the tooth this band is allowed to be nearly the length of the crown. It will be seen that when this band is fitted as perfectly as possible there must necessarily be quite a vacancy between the upper part of the lingual surface of the tooth and the band. It is important that this portion of the band fit the tooth perfectly, and an accurate adaptation is obtained as follows: A piece of pure gold, rolled to 35 American gauge, is fitted over that portion of the lingual surface of the tooth which it is desired to cover. *d*, in Fig. 2, shows the shape that this little pure-gold

plate usually assumes. It can easily be fitted perfectly by the use of a burnisher, and then, with the band in position, a drop of melted resin wax is flowed into the space between the pure gold and the band. It is now removed from the tooth, invested, and, after melting out the wax, solder is flowed into the vacancy, filling completely the space occupied by the wax. The top of the lingual portion will now be thicker than is necessary, but can be easily ground or filed down to the proper thickness. We now have a band which fits all portions of the tooth perfectly. The anterior end of the bridge is soldered to this band, and after the work is properly finished it is cemented in place in the usual manner. *b* and *c*, Fig. 2, show side and lingual views of this band after the fitting is completed.

FIG. 3.

Figs. 3, 4, and 5 illustrate a method of inserting extensive pieces of bridge-work in cases where there are no natural teeth or roots for supporting one end of the bridge. The work from which these drawings were made was constructed by Dr. H. A. Parr, of New York, By this method bridges may be inserted in cases where all of the teeth on one side of the mouth have been lost, or where all of the teeth anterior to the molars on both sides are wanting. Crowns are first fitted to the teeth which remain. These crowns being in position, an impression is taken. From this a cast is obtained with the crowns in their proper positions. A second impression is also taken of that portion of the mouth where there is no natural support for the bridge. From this impression metallic dies and counter-dies are obtained, from which is "struck" a small gold plate about three-fourths of an inch in length and width, the size of the plate varying according to position and other conditions. After this little plate or "saddle" has been perfectly fitted, it is waxed in the proper position on the

FIG. 4.



model, with the crowns. The intervening teeth are now placed in position, and the work invested and soldered. I have had no practical experience with this method, but Dr. Parr informs me that he has inserted several cases which are being worn with perfect satisfaction. To provide for the possibility of shrinkage or absorption at the point where the plate or saddle rests, I would suggest that it be not soldered to the bridge, but attached by means of an adjustable screw.

Fig. 5.

Fig. 6 illustrates another device for obviating the necessity for removing the crowns of natural teeth in preparing the mouth for bridge-work. Crowns are fitted in the mouth to the points of attachment in the usual manner. An impression is taken, bringing the crowns away in their proper positions. From this the cast or model is obtained. Heavy bands of half-round gold or platinum bars are now fitted around the necks of the natural teeth on their lingual surfaces. These bands being waxed in position, serve to connect the different parts of the bridge, uniting them in one piece without the loss of any of the natural crowns. I have found this a highly satisfactory method of inserting extensive pieces of the work. Fig. 7 shows the mouth as presented for which the piece shown in Fig. 6 was constructed. Fig. 8 shows the piece in position.

Fig. 6.

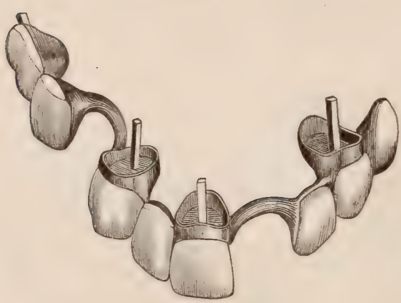
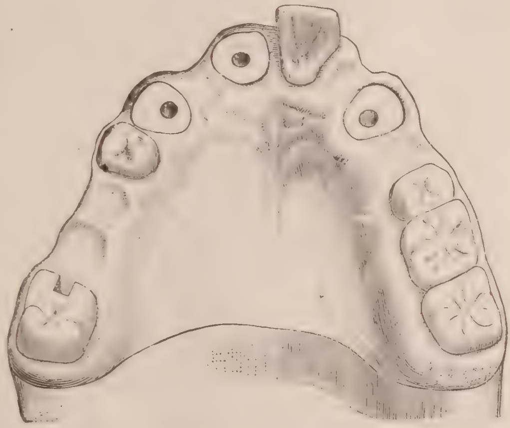


Fig. 9 illustrates a case which is a type of a class of frequent occurrence. Alternate molars and bicuspids in the upper and lower jaws are lost until the occlusion is somewhat changed, and the force of mastication is gradually brought upon the front teeth. Rapid wearing of these teeth results. These cases are among the most difficult that the operator is called upon to treat by the ordinary methods. In the case herewith illustrated the lower bicuspids with a molar on one side were in good condition, but the loss of the upper bicuspids and molars made them useless. As usually happens, the upper incisors had suffered most. The lower incisors were restored by capping them with cohesive foil. The bridge shown at

Fig. 10 was constructed for the right side of the upper jaw, while the teeth on the left side were restored by contour work, as shown at Fig. 11.

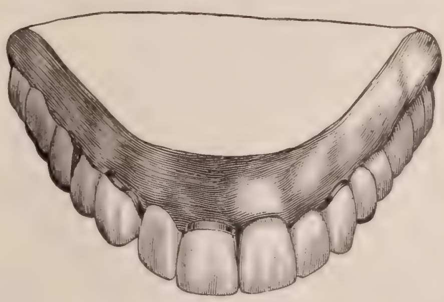
The superiority of the condition of this patient's mouth, which resulted from this work, over anything which could have been accomplished by plate work is almost inconceivable to one not familiar with these methods.

FIG. 7.



The only annoyance which bridge-work is likely to cause patient or operator is the occasional breaking of a porcelain, an accident of not frequent occurrence. While the replacing of a broken porcelain has never been a matter of extreme difficulty, yet I have always regarded the methods hitherto employed as more or less imperfect and uncertain in their results. This led me to devise a method of replacing broken porcelains which leaves the work fully as strong as before; a method which makes the operation a very simple one, requiring less than an hour for its performance; and after the porcelain has been replaced, an expert would not discover any traces of an accident.

FIG. 8.



After removing all traces of the broken porcelain, the projecting pins are cut off, and two holes drilled through the backing in the exact position occupied by the pins. The narrow space of metal now intervening between these two holes is cut out with a fissure-bur. This leaves a groove which should not be wider than the diameter of the pins. The length of this groove should now be increased on the lingual surface, but not on the front. The object of this is to give a dove-tail shape to the groove, which is easily effected by the use of the same fissure-bur above referred to. The lingual appearance of this groove when properly shaped is shown in

Fig. 12. The proper tooth is selected, the pins passed through this hole and bent outwards into the dove-tail groove. It will be found almost impossible to bend these pins into their proper positions by any ordinary means, so as to hold the tooth quite rigid and immovable. An instrument herewith illustrated (Fig. 13) accomplishes this feature of the work in a very simple and effective manner. Its use

FIG. 9.

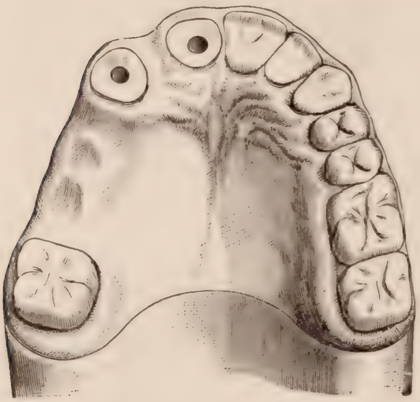


FIG. 10.

is almost too nearly evident to require description. Both the rubber pad which rests upon the porcelain front and the wedge-shaped point which passes between the pins are made to rotate in their sockets, so that any desired position can be obtained. A firm closure of the instrument when in position forces the pins outward into the dove-tail groove, and the tooth is immovably fixed in place. It now remains but to fill the space between the pins with any form of co-

FIG. 11.

FIG. 12.

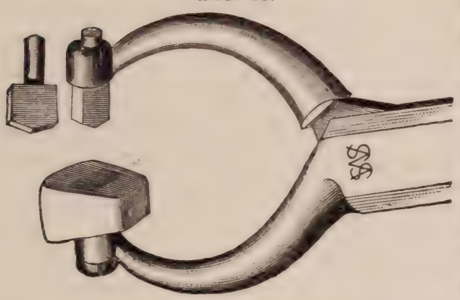
hesive gold (I use crystal gold), and with corundum, Arkansas, and rubber points in the engine the surface is finished and polished. The wedge-shaped filling of crystal gold acts as a keystone between the pins, and makes a most perfect method of repair.

The practice of extracting badly-decayed and broken-down teeth, particularly when they became a source of constant annoyance, and

replacing them with artificial substitutes mounted upon rubber, celluloid, or metallic plates, has become so firmly established in the public and professional mind as the proper and unavoidable thing, that the folly of such practice can only be demonstrated by persistent and long-continued endeavor. The statement, therefore, that it is no less a criminal practice, *in principle* if not in degree, to extract a tooth because it is in an ulcerated or broken-down condition, than would be that of amputating a finger because of the appearance of a felon, or removing an eye to get rid of a cataract, will seem a radical one. But if my experience has taught me anything it certainly is no exaggeration of fact. Diseases of the teeth and the surrounding tissues are certainly as amenable to treatment as are ulcers or morbid growths in other parts of the body. The only conditions necessary to the successful accomplishment of this are requisite knowleged and skill in the operator and a desire on the part of the patient to have a healthy mouth.

A properly-made artificial crown mounted upon a root, the investing membrane of which is in a healthy condition, is quite as useful and, all points considered, perhaps quite as desirable as a pulpless tooth with its natural crown intact. Such is my confidence in the intrinsic merit of bridge-work that I think it requires no very great degree of foresight to predict that the day is not far distant when a large per cent. of the now prevalent partial-plate work will be a thing of the past. In closing, I desire to say a few words for the benefit of those who are still unreasonably disposed to criticise bridge-work.

Fig. 13.



Dr. W. H. Dwinelle said many years ago, in a paper on the use of crystalline gold:

"It seems to me the height of folly for one man to make himself the standard of all human ability, and to urge his own *negation* as evidence against a living fact; to endeavor to do away or to deny the existence of a positive or tangible truth by negative testimony. It is saying, I do not succeed, *therefore* you do not; others do not succeed, consequently no one does. This kind of reasoning in no way affects anything but itself. It is simply a *confession of inability*, and there it stops. It is an array of what *has not been done* against what *has been done*."

Bridge-work *has* been successful in my hands, and every demonstrated success in the application of new principles in any field of human effort is a monument of truth which towers above all the negative opinions of the world; it is the granite mountain-top against which the storms of error and prejudice may beat in vain forever.

DENTAL CARIES.—IV.

BY A. MORSMAN, M.D., D.D.S., IOWA CITY, IOWA.

(Continued from page 669.)

PART SECOND.—NOSOLOGY.

1. Nomenclature, Historical Résumé, and Theories.

Nomenclature.—Unfortunately, in the early study of tooth-disintegration its similarity to caries of bone caused it to be looked upon as identical with it, and so it was of seeming fitness that the same name be applied to both conditions. In the eyes of later science the two diseases have nothing in common, but before this discovery was made "dental caries" had become so identified with tooth-disintegration that it was not easily dropped. More than that, there has been no time yet in the history of "dental caries" when theorists have agreed as to what the disease was or what its causation. It is exceedingly unfortunate that a name so entirely inappropriate should be put into the mouths of scientific men, and various substitutes have been suggested: "decay," "disintegration," "gangrene," and "chemical decomposition" are of the number.

"Decay" is already in common use. It is open to the same objections as is "dental caries," in that it is the name of something else. Putrefactive changes take place in dental caries, but it is yet to be proved that these changes are of more than minor importance. "Disintegration" means too little, although it is not objectionable. "Gangrene" does not apply, and "chemical decomposition" cannot be accepted while the war of theories lasts. Recognizing that "caries" is a misnomer sanctioned only by custom, and the impossibility of selecting a term that *does* express the condition, its use is continued here.

History.*—The time when dental caries was not is beyond our knowledge. From the very earliest traditions and records toothache has been a common affliction. Like every other ailment in the early, superstitious times of man's existence, every variety of means was used to combat this affection. Incantation, prayer, disgusting and absurd applications, cauterizing the temples with fire, and removing

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* I shall make no attempt in this brief résumé to give authorities.

the offending tooth by means more heroic than skillful. Aretæus says: "The cause of toothache is known only to God." Lazerus Riverus: "And because the small veins by which nourishment is carried to the teeth do run by the ears, you may put medicine into them for the cure of toothache." Even as late as the seventeenth century it was a popular belief that worms caused caries and that they were to be found in the cavity.

Hippocrates and Herophilus were humoral pathologists, and ascribed toothache to a bad condition of the humors. They treated it by counter-irritation. Galen has given the formula for a mixture to *relieve pain* in hollow teeth.

Celsus gives no description of caries, but prescribes applications of aromatic substances to the tooth and emollients externally, accompanied by systemic treatment and directions as to diet. This was about A. D. 40. From that time to the sixteenth century darkness in this branch of medicine reigned supreme.

1536. According to "Dental Bibliography," there was a book entitled "Zahnarzney," published in Frankfort. The author is unknown.

1548. Ryff, Gualther Hermann. A treatise on the eye, the eyesight, and the teeth. We know nothing of its teachings.

1561. Ambrose Pare. He regarded the teeth as bones, and caries in both as identical.

1678. Leuwenhoeck's discoveries as to the anatomy of the teeth. This was a great stimulant to the study of caries.

1728. Fauchard distinguished several forms of caries, and assumed an internal and an external cause. The former acted upon the roots, root-canal, and interior of the cavity; the latter upon the outer portion of the tooth. The internal cause he supposes to be acrid lymph.

1757. Bourdet states that when the fluids in the dental vessels are too thick they putrefy and act on the teeth. He also gives a correct explanation of symmetrical decay in homologous teeth.

1778. Hunter thought that decay "deserved the name of mortification," but he was not satisfied with it, for he says, "Therefore I am apt to suspect that during life there is some operation going on which produces a change in the diseased part." Cuvier held similar views.

1796. S. K. Mitchell demonstrated "the existence of an acid in the mouth capable of decomposing the teeth."

1806. Fox propounded the inflammatory theory, and says that caries in teeth differs from the same disease in bone only in that "the teeth do not possess sufficient living power to effect the process of exfoliation."

1821. L. S. and E. Parmly first proposed, in the United States at least, the chemical theory.

1831. Bell agreed with Fox as to cause, but proposed the name "gangrene" as a substitute for "caries."

1835. Robertson, of Birmingham, says: "The only cause capable of explaining the partial operation and the particular situations of decay is the corrosive or chemical action of the solid particles of food, which have been retained and have undergone a process of putrefaction or fermentation in the several parts of the teeth best adapted for their reception." This is really the first *definite* enunciation of the chemical theory.

1838. Regnard held the same views, and issued a pamphlet on the subject.

1840. Koecker advanced the theory of contagion.

1843. Westcott demonstrated experimentally the action of acetic, citric, and malic acids, and also sugar upon the teeth.

1846. Desirabode maintains the dual character of caries; that when caused by chemical action it proceeds from without inwards, but may also arise from pulp injury, in which case it proceeds from within outwards.

1846. Linderer scouts the idea of inflammation, and advances the purely chemical theory. He also calls attention to the zone surrounding the carious portion. He distinguishes three stages: First, the destruction of the enamel; second, the discoloration; and, third, the liquefaction of the mass. He does not believe in internal caries.

1846. Ficinus considered that caries had its origin in the "cuticle of the enamel." He distinguished a putrefactive process caused by infusoria which he called "denticolæ." This process extends from the enamel membrane to the enamel itself, and thence to the dentine.

1850. Klenke believed in a quadruple origin for caries: First, central or inflammatory; second, a parasite which he calls protococcus dentalis; third, putrefaction and infusoria; fourth, *dissolutio chemicalis chronica.*

1858. Allport showed by experiment the action of acids upon the teeth.

1859. Tomes, first edition "Dental Surgery." He did much for the pathology of this disease, and originated the chemico-vital theory. He believed dental caries to be to some extent inflammatory, but if not, that the vitality of the tooth was at least a resisting force. He looked upon the "transparent zone" as due to consolidation of the dentinal tubes by calcification of the fibrils, a barrier thrown out by the pulp against the invasion of the disease. The origin of the

acid he referred principally to the mucus and saliva, and believed that the progress of the disease resolved the tooth into its histological elements. He also demonstrated the formation of secondary dentine.

1860. Neumann agreed with Tomes as to the resistive power of the dentine, but regarded the consolidation of the tubules to be a thickening of the sheaths at the expense of the basis-substance. He considered dental caries to be a veritable "odontitis," and thought the distinction between caries of bone and caries of teeth purely formal.

1862. Oudet advocated the theory of "internal caries," in which the dentine was the tissue primarily attacked. He believed an external cause might exist, and called its resulting disintegration "chemical change."

1867. Magitot elaborated the theory of resistance and consolidation of dentine, but eliminated the idea of inflammation. The cause, in his opinion, is strictly chemical, and he pushes aside all beliefs of varieties with the emphatic statement, "caries is one." He divided the disease into periods: First, superficial or caries of the enamel; second, middle caries; and third, deep or penetrating caries. He claims to have produced caries artificially save as to the reactionary phenomena. He has also given us valuable statistics on the subject.

1867. Hertz experimented with caries artificially produced, and also with artificial teeth carious in the mouth. His belief was similar to Neumann's.

1868. Leber and Rottenstein demonstrated the presence of leptothrix granules in the dentinal tubes. They claim that it is to this that the appearance of calcification is due. Hence, they deny the reaction of the dentine. They believe the elements of the fungi proliferate in the canaliculi and expand them, thus aiding the disease; that all the phenomena of caries can be seen in human teeth and ivory ones used as artificial substitutes, and that caries can be produced artificially out of the mouth. To caries of the enamel they ascribe largely a chemical cause.

1868. Bridgeman propounded the electro-chemical theory. He assumed a likeness between the teeth and a copper wire partially submerged in acid. Giving to the crown of the tooth electro-negative qualities and to the gum electro-positive qualities, he asserts an electro-chemical action. He continued the reasoning to the metals used for filling teeth, thus accounting for secondary decay. The whole fabric of his theory based on assumption was notable for its ingenuity. He had many followers in this country. That this was a prize essay is a commentary on the knowledge of the times.

1870. Wedl places caries under "anomalies of the secretions," and

considers it due to abnormal secretions of the oral membranes and salivary glands; that in consequence of their fermentation acids are formed which act upon the teeth. He believes the granules seen in the canals to be in part at least fat-globules. He has verified part of the experiments of Leber and Rottenstein, and agrees with them as to the proliferation of leptothrix in the canaliculi, but considers acid essential to the progress of the disease. He has been unable to satisfy himself of the calcification of the fibrils, and says, positively, "There are no grounds for ascribing the changes in the dentinal fibrils to an inflammatory reaction of the pulp."

1871. Mummery investigated the relative frequency of caries in the different races.

1873. Tomes, second edition, "Dental Surgery," Appendix. Mr. Tomes has here modified his views very materially. He has abandoned all idea of vital action as a part of caries, and regards the calcification of the fibrils as doubtful.

1873. Spence Bate attributes caries to carbonic acid in abnormal quantities acting in a nascent state.

1878. Frank Abbott believes the cement, dentine, and enamel to be traversed by a network of living matter, and that there is a reaction against the advance of caries. "In chronic caries merely a chemical process takes place, assisted by putrefaction of the organic constituents of the tooth." He has never seen the penetration of organisms into the canaliculi until after thorough decalcification had occurred. His investigations have been mainly with the microscope, and he has added considerably to the histology of this condition.

1879. F. Y. Clark looks upon "dental bacteria" as the cause of tooth-decay. He describes them as "half-U shape, from one and a-half to three micrometers long, by about one-half wide," and says they have a screw-like motion. He believes he has demonstrated that when infectious dentine is left in a cavity, however well it may be filled, decay does not cease.

1880. A. Weil advanced the theory that leptothrix bores directly through Nasmyth's membrane and then into the enamel.

1881. Coleman, "Dental Surgery," accepts the chemico-vital theory as first propounded by Tomes.

1881. Underwood and Milles believe that this disease as well as suppuration of the alveolar membrane is dependent upon micro-organisms; also, that previous experiments showing caries to be due to acid are void because septic conditions prevailed.

1882. Miller, of Berlin, by a series of accurate and valuable experiments, seems to have demonstrated that micro-organisms do not precede decalcification, but that they are the cause of the disin-

tegration of the matrix after the removal of the lime-salts by acids. He is of the opinion that there is one kind of fungus that does have the power of boring directly into sound dentine, but at an angle to the tubuli; that it generates an acid upon its growing extremity by which the result is accomplished. He is not willing to say that it occurs frequently enough in the human mouth to make it an important factor in caries. He thinks that chemical action and micro-organisms are both incapable of accounting for *all* the phenomena of dental caries.

1884. Sewill takes the stand that the enamel and dentine are both perfectly passive under the carious process, but offers no evidence to sustain his proposition.

1885. Frank Abbott. An excellent contribution to the pathologic anatomy of enamel predisposing to dental caries. Read before the American Dental Association.

Theories.—There have been many theories advanced to account for the cause of dental caries, and all shades of belief have been indulged in. I shall outline only those prominent ones of quite recent popularity.

The vital or inflammatory theory made of caries an inflammatory disease having a central origin. It accounted for the external appearance of decay by the statement that, as the periphery of the tooth was furthest from the nutrient supply, it was therefore the first to break down under the disease. It, of course, recognized internal caries, and considered the dentine as capable of the same inflammatory action (modified) occurring in bone.

The chemical theory recognizes the existence of acids in the mouth, and that these acids are capable of dissolving or forming soluble compounds with the lime-salts entering into the formation of the teeth. It denies the existence of internal caries, and considers the tooth entirely passive under the process. The origin of the acids is in fermenting foods about the teeth or in the secretions of the mouth.

The chemico-vital theory is a combination of the two before mentioned. According to this belief, the acids of the mouth act upon the inorganic tissues, and in so doing the irritation is conveyed to the pulp through the dentinal fibrils, and it reacts against the invasion of the disease by throwing lime-salts into the fibrils, causing their calcification, and thereby the entire solidification of the tubuli. By this means a solid wall of dentine is presented to the advancing disease. Many of the chemico-vitalists believed that the inflammatory action was not only resistive, but that it also caused the death of the organic portion of the tooth in advance of the chemical action.

The parasitic theory accounted for caries by the agency of micro-

organisms, and recognized the action of acids only in removing the enamel. The theorists were not definitely settled as to what species of organism the destruction was due, and they included in the category every variety that could be found in the mouth, and some that could not be found there. The enamel being removed by acids, the organisms penetrate the tubuli of the dentine and proliferate there,—according to some writers, merely expanding the tubuli for the better penetration of acids, and, according to others, generating themselves an acid by their action upon the organic matter. This theory regarded them as the "advance guard" and prime cause of the disease.

The chemico-parasitic theory is another combination. Giving to acids the first place, it accounts by their agency for *all* the decalcification of the tooth in the same manner as does the chemical theory. Following this process come the micro-organisms, which penetrate only when decalcification has been sufficient to permit their advance. Then they are found in great quantities and cause the putrefaction of the organic mass. Whether there is one or several species is still an open question, as different forms may be developmental stages of one fungus.

The chemico-putrefactive theory is the same as the above, save that the micro-organisms are only incidental to the putrefactive process and have no part in the disease.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION—TWENTY-FIFTH ANNUAL SESSION.

(Continued from page 691.)

THIRD DAY.—*Afternoon Session.*

THE association met at 3 o'clock P. M. President Crouse in the chair.

Dr. A. W. Harlan, Chicago, stated that in dividing the work of the association no provision was made for reports on "Surgery." To remedy this defect, he moved to amend the constitution so as to include this subject in the duties of Section VI. The amendment was adopted unanimously. Section VI will hereafter be known as "Section VI, Pathology, Therapeutics, Materia Medica, and Surgery."

Section V was passed, and Section VI was called.

Dr. Harlan, chairman, read his report,* and announced that the Section had two papers to present, respectively by Dr. Patterson and Dr. Atkinson.

Dr. J. D. Patterson, Kansas City, read his paper, which was entitled "The Catarrhal Nature of Pyorrhea Alveolaris." †

Dr. W. H. Atkinson, New York, read his paper entitled

Pyorrhea Alveolaris—Sponge-Grafting in Relation Thereto.

True diagnosis is the first prerequisite. There can be no real pyorrhea alveolaris without loss of attachment of the dentium ligamentum, superficially or deep into the socket. Flow of pus is always evidence of failure of first effort of the system to produce new tissue to take the place of that which has been lost through traumatism or mal-nutrition, singly or in combination. Pyorrhea is cured by destroying the microbes which prevent the formation of new tissue by first intention,—regular granulation as it is called. That arising from mal-nutrition is cured by rectification of the constitutional and local conditions which precede and accompany the diseased acts.

Imperfect elimination of urea is the principal constitutional antecedent of pyorrhea. This form is only *palliated* by local treatment.

Traumatic pyorrhea is resultant upon the presence of foreign bodies in the alveoli, such as bones, splinters of wood, or misplaced teeth, or parts of fractured teeth and bones; and is cured by removing the foreign body and securing a sterilized pocket for the new growth.

Calcareous deposits are never the cause of pyorrhea, and but seldom even concomitant with the malady properly so classified. Nevertheless, they should be removed and prevented from re-forming by proper cleanliness.

Pus, sanies, and ichor are products of microzymes capable of destroying the pabulum brought to the seat of lesion for repair. Many parasiticides are capable of destroying these microbes.

Escharotics not only destroy the bacteria, but also convert the pabulum and soft tissues into a sort of scab of "cooked flesh," of a density commensurate with the strength of affinity between the remedy and the protogenous mass, with which it combines by what has been called chemical affinity. Wherever this pellicle is insoluble in the solution which produces it, the production of microbes from the outside is prevented, and the scab now supplies the "sterilized pocket"—"utricle"—in which normal tissue of the part will form.

Nitrate of silver has long been known as able to afford this kind of

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* See page 673, Dental Cosmos for November, 1885.

† See page 669, Dental Cosmos for November, 1885.

protection to granulating surfaces by supplying the outer wall of the "utricle"—"pocket." In good constitutions non-sterilized pockets may continue to discharge those products of the killed pabulum,—pus, sanies, ichor,—for an indefinite length of time, often during the life of the subject.

For constitutional treatment, correct gymnastic exercise, tonics, and alteratives are to be resorted to, viz.: exercise just short of fatigue, bathing, and regular rest in sleep of eight hours per day; as a tonic, sulphate of cinchonidia, four to six grains per day in two or three doses of two grains each, persisted in until the blood column is in full supply of cruorin (hemaglobin).

For local treatment, three principal remedies are preferred, viz.: elixir vitriol (full strength), aqua regia (one part to seven of distilled water), and a caustic paste made of crystallized carbolic acid and caustic potash rubbed into a paste of equal quantities in a glass or wedgwood mortar, *without water.* This last is now known as the "Robinson Remedy," when made with water. These remedies, with many others, are capable of meeting our necessity in these cases.

The great obstacle to correct practice among all sorts of healers is the lack of knowledge of the principles of molecular changes and the manner of their presentment in health and disease.

The principal incitement to write papers on professional topics is to so state the facts of diagnosis and application of remedies that have led me safely as to enable others to profit by my experience. The stages of loss of the attachments of the teeth to their sockets will be met by the use of the remedies in the order here named, viz.:

Where slight recession is present and little or no discharge perceptible, use elixir vitriol in the little recesses; where the loss of attachment is greater, and accumulations of food, microbes, or soft or even hard lime-deposits occupy the recesses, use aqua regia; where the loss is greater still and the gums dark, swollen, and discharging pus, sloughs, and bloody serum, then resort to caustic paste, being nice and careful about seeing that it touches *only* the depth of the pockets and their margins without flowing over on to the membrane, and especially the lining of the cheeks and lips.

In the whole history of surgery there is no method of so much value and so little understood and practiced as that which has been called sponge-grafting. Like most of the knowledge of principles and modes of practice in our specialty, it grew out of the misfortunes of traumatic or functional lesion. The first use made of sponge-grafting in a crude way was by obstetricians, to fill the gap of cervical fissure of the uterus resulting from violent and tedious labor. I remember the discussions as to what became of the sponge. In

one case, of a very nervous woman, then called hysterical, it was questioned whether she did not purposely remove the sponge, although she stoutly maintained the contrary. The cases submitted to this treatment did so well that the method was kept secret among a few for years.

At that time a solution of bichloride of mercury in water, alone or with sal-ammoniac, was the external remedy used for scabies (the itch). Dr. Wm. Woodruff, of Meadville, Pa., at the suggestion of a pupil then studying with him, wrung out a sponge in this solution and used it in a badly-torn cervix uteri following labor, which healed so kindly as to induce him to adopt it in the general treatment of these lesions.

The tediousness of the drainage method of healing large loss of tissue by fibrous tents, rubber tubes, or horse-hair or other setons, to induce granulation, is greatly abridged by the use of a sponge-graft in place of a tent, which tent must be removed before the wound can be closed completely by the new growth.

Efforts to assist nature in healing wounds and in reproduction of lost tissue from traumatic lesion, or from functional lesion, had been so various, bungling, and inhuman, that it is no wonder that a mere *expectante* course long held dominion in the annals of surgery. From the abhorrent use in surgery of *the actual cautery* in the shape of boiling oil (into which the bleeding stump was plunged), and red-hot iron and embers applied to bleeding wounds, and the *potential cautery* in the shape of the strongest alkalies and acids to arrest hemorrhage, the "wait and watch" treatment was established. The lack of any just apprehension of the process of inflammation permitted the introduction of "irrigation" and "drainage" of wounds and abscesses as helps to "granulation," as healing of suppurating tissues was then called.

Healing by "first intention" has always been regarded with high favor. Every method and management conducive to this form of healing must be of the highest importance. Transplanting bits of skin and bits of epithelial tissue led to such kindly results as to suggest the introduction of some receptacle in which the blood-plasm might be received and held in place to form a clot in the gap of the wound, to be metamorphosed into the scar-tissue taking the place of the lost substance.

Many forms of animal sutures and of flesh tents were resorted to, especially fibrous tissue in the shape of tendons. At length sterilized tents were introduced, which were gradually extruded as the new formations progressed in the depths of the wound, and had to be cut off, from time to time, until at last a mere shred remained in the pit left at the site of the former wound-tract. Sterilization, now

known as "Listerism," is a great step in advance of the old filthy method of uncleanly carelessness.

The accounts of chicken's flesh and other forms of non-human animal flesh being used to fill gaps of lost tissue may be dismissed with the verdict of "not proven." The accounts of the use of sterilized sponge on the other side of the Atlantic led me to try the method in my own practice. The results have been so favorable as to induce me to write this paper, with the hope of having my brethren become partakers of the benefits of the simple and beneficent device.

Take a case where a portion of the flesh has been quite removed by the bite of a dog, cut with a knife, buzz-saw, or other free-cutting instrument. It is only necessary to staunch the bleeding and fit a bit of sterilized sponge of the size and shape of the lost flesh and cover it with some impervious dressing, of oiled silk, sheet rubber, court plaster, gold-beaters' skin, Husband's plaster, or such like, over-which a light support, without pressure, should be secured to keep the exudate of blood-plasm from escaping too freely. When this is done in a healthy subject we may look for union by first intention, without one drop of deteriorated pus or other aberrant product of the albuminoid clot which fills the cavity, and out of which the new growths of tissue come.

Destruction of all disease-germs which adhere to the dressings constitutes the sterilization or Listerism which proves so conducive to healing by first intention. A large number of germicides are at our command, which are competent to effect sterilization. The chief one and leading the list is a solution of bichloride of mercury, of from one in five hundred (1 in 500) to one in a thousand (1 in 1000) parts of distilled water.

Sponge-grafting conserves the time and energy of the healing process. The former manner of determining the point at which to cease dressing was to place the finger upon the new growth. If the plasm broke short without adhering to the finger and forming a more or less tenacious rope, which broke as the finger was carried away further and further, it was deemed necessary to continue stimulating dressings. But if the rugæ of the finger left their imprint upon the jelly-like mass closing the wound, it was deemed better to simply protect it from outward disturbance by a simple non-irritant dressing. If the plasm was so watery as to not rope at all, dressing with some coagulant was advisable.

With the old training to guide us, and the present better understanding of the character and steps of the inflammatory process, we are more able to discriminate the indications of favorable progress and unfavorable regress of the healing processes.

Discussion.

Dr. Abbott. For some two years or more I have been using a spray instrument for the treatment of abscesses of the antrum, alveolar abscess, teeth where they need antiseptic applications, and in pyorrhea alveolaris. I have quite a number of points that I use for the purpose; I simply introduce this here to show the method of application. It is an excellent means of applying remedies for nasal catarrh, or any catarrhal inflammation of the mucous membrane of the pharynx or larynx. If it is desired to apply any antiseptic where tartar has been removed in cases of pyorrhea alveolaris, we take a small instrument with a fine gold tube which can be passed as far below the margin of the gum as you desire, when, by turning the spray on, the remedy is driven into every possible recess. In treatment of abscesses of the antrum, it is necessary to have medicine applied to every portion of the cavity. In an hypertrophied condition of its mucous membrane there are frequently layers of it, from top to bottom, in the folds of which pus is often found. To cleanse these thoroughly by the ordinary methods is very difficult, but this apparatus overcomes the difficulties, as with it the remedy is carried in every direction and to every remote point. Any remedy which does not crystallize too rapidly can be used with the finest of these tubes. Pure "Listerine," which crystallizes very rapidly, would stop up these instruments in a very short time, unless they are kept washed thoroughly with water. In fact, these fine tubes should be washed out with water-spray every time they are used; any remedy may be used, as long as it is in liquid form and capable of being thrown with a spray instrument.

This instrument is made by a German by the name of Charles Beseler, 218 Centre street, New York. I expect the instrument will be placed on the market by another house soon. It will then be made more perfectly, *i.e.*, the spray-points will all be made alike and of the same size; the air-receiver will have a thermometer, so that if it is desirable to have the air heated the degree can be noted. This receiver will sustain fifty pounds' pressure, which is increased but slightly if heated to 120° F.

Dr. Marshall. I would like to ask Dr. Atkinson a question in regard to sponge-grafting. He speaks of protecting the graft after it is put in. I would like to have him explain how he protects it in the mouth, where he wishes to reproduce tissue around the root of the tooth?

Dr. Atkinson. If in case of loss of substance by pyorrhea or any other mode of sloughing the teeth are loose, you must tie them with silk ligatures; if they are too long to make the occlusion

as you want it, trim them off until you get the occlusion where it will bring each tooth into such position as to do its modicum of use in the mouth, and distribute the force as uniformly as possible. Then take an impression, pour the plaster into the impression, and get a cast. You will see where the tissue is missing. Build that up with wax, plaster, or composition, a little higher than you want your new growth to come, so that there will be an opportunity for a little bit of shrinkage when the apparatus is removed. After you have done that make a die, and strike a thin piece of platinum so as to make a perfectly tight pocket that will be turned delicately down wherever the irregularities or loss may be, and also fit to the tooth sufficiently tight to prevent anything entering. You will have to make one for the inside and one for the outside and tie them together in place. That is the best protection for this particular class of cases. Where the tissue is lost by sloughing, by tumors, by any kind of enlargement of the neighborhood where the morbid tissues have pushed the tissue out of the way, if you have too much skin to make it right, take the excess of skin off, so that it will collapse and close the cavity, after removing everything of the character of morbid growth, and have your sterilized sponge cut as near as possible to the shape of the chamber, so that it will not press too much and not press too little.

Now, I want to say, after answering your question, that I have not been able to detect scar-tissue in a gum where tissue has been reproduced. There was no difference of the tissue from the original gum, and I do not feel satisfied to call it scar-tissue; I call it reproduced tissue. If it be scar-tissue it is scar-tissue A No. 1. It is very important to get proper sponges. Get surgeons' fine sponges anywhere in a good drug-store; see that they are perfectly free from all foreign elements, and put them in a sterilized solution made after the manner that I described in the paper. I make it with one grain of bichloride of mercury and one ounce of distilled water, raised to 130° Fahrenheit. I will give you my reasons for that. At 133 albumen begins to coagulate, or fibrilate, a little, up to about 163 or 164; if it goes beyond that it becomes cooked, so that it is not fit to be wrought into tissue. If the sponges are boiled they will shrink, and as soon as the sponge begins to shrink you kill the very material that is converted into tissue, or is capable of being absorbed.

Dr. Marshall. My attention was first called to this subject, a year ago last May, by a paper read by Edward C. Briggs, of Boston, at Washington, before the Section of Dental and Oral Surgery in the American Medical Association. He had met with the same difficulty that I think most of us have met with in our attempts to use the sponge-graft, viz.: that it often became displaced. I should

think the suggestions that Dr. Atkinson has made with regard to the method of protecting it are good, and I have no doubt I shall be able hereafter to succeed with sponge-grafting.

Dr. Briggs, in his paper, advised the preparation of the sponge after the formula which was recommended by a St. Louis surgeon, Dr. Edward Borck. He was in the habit of placing his sponge in dilute hydrochloric acid, to dissolve out all the earthy salts, and then to treat it with ether and iodoform; but I found that sponges treated in that way and then excluded from the air, would very soon shrivel up and become soft and good for nothing, and consequently I stopped right there. But when I go home I shall try again, with the suggestions given by Dr. Atkinson.

Dr. Briggs suggested that certain forms of cleft palate, or rather perforations of the palate from accident or specific disease, might be treated successfully by sponge-grafting, and it seems to me perfectly practicable that all forms of clefts in the hard or soft palate should be thus treated.

I want to say a few words upon some of the other points brought out in the report of the chairman of the Section. First, with regard to the remarks of Dr. Harlan, in his comparisons between cocaïne and cannabis indica. Since the doctor called our attention to the use of cannabis indica for obtunding sensitive dentine, I have been experimenting with it, but so far I have not been able to get the results that I get from cocaïne. There is one fact regarding cannabis indica which I fear will make it a very uncertain drug to use, namely, —it is claimed by pharmacists and physicians that it is a most unreliable drug. You may make preparations from what appears to be the perfect flower, and when you come to use it the results are *nil*, while another preparation may operate beautifully. The majority of physicians have laid it aside from that fact, and I apprehend we shall find the same difficulty when we come to use it as a local anesthetic in the mouth. When the active drug can be obtained I am inclined to think we shall get good results. I applied some of this preparation that has been passed around,—prepared by Parke, Davis & Co., of Detroit,—to the tongue and the mucous membrane of my mouth, but could get no results from it. I attempted to use the tincture recommended by and made expressly for Dr. Harlan, by Sargent, of Chicago, for obtunding sensitive dentine; in one case in which I gained no result, so far as obtunding the sensibility of the tooth was concerned, the patient told me at the next sitting that for thirty-six hours afterwards he had a peculiar benumbed sensation in the cheek and gum. But in its effects upon sensitive dentine I have not found it as satisfactory as the citrate of cocaïne.

With regard to pyorrhea alveolaris, I have seen a great many

cases which I could not attribute to local causes, and I am of the opinion that many of these cases were of constitutional origin. The English view in regard to it is that it is the result of a rheumatic or gouty diathesis. I have seen cases in which patients were suffering from diabetes mellitus, and Bright's disease of the kidneys also, in which all efforts at local treatment had failed to cure the pyorrhea until they received constitutional treatment by the physician, and when the symptoms of the diabetes or the Bright's disease were mitigated there was an improvement in the pyorrhea alveolaris. I can mention several cases affecting ladies, who had also been troubled with uterine difficulties, and in which all local treatment had been unavailing. But when they were turned over to the gynecologist, and the uterine displacements had been corrected, and the inflammatory conditions reduced, there was great improvement in the local conditions in the mouth, and in three cases which have come under my personal observation they were cured without any local treatment whatever. As soon as the system was put in a healthy condition, there was a subsidence of the pyorrhea alveolaris.

Dr. Davis. My experience with cannabis indica has been quite the opposite of Dr. Marshall's. The day following the reading of Dr. Harlan's paper, at the last meeting of the Chicago Dental Society, I purchased some of the tincture prepared according to his formula, and have tried it in almost every case of sensitive dentine that has come under my notice since, and in *one particular case* where I had used the cocaïne last November without success I found cannabis indica to produce very marked results within five minutes from the time of applying it. The case—one of those that usually give us so much trouble—was caries of the lower incisors, around the gingival margin. The patient, who was of a very nervous temperament, was not informed that any remedy was being applied, and to prevent her taking any notice of it, and thus allow her imagination to play an active part, I busied myself arranging the rubber-dam and drying out other cavities. The result, from a five minutes' application, was entirely successful, and like results were obtained in the remaining cavities.

I have since used the fluid extract (officinal) in obstinate cases, and have yet to experience my first failure with the drug as an obtunder of sensitive dentine. In extracting, I have applied it for twenty or thirty minutes, both the tincture prepared according to Dr. Harlan's formula and the fluid extract, but without any favorable results.

Dr. Abbott. I would call attention to two other purposes for which the instrument previously alluded to can be used: one is for a chip-blower, and another is for producing local anesthesia.

Dr. Taft. I would suggest that it could also be used with a warm-air blowpipe.

Dr. Abbott. It can be set with a lamp under it kept burning all the time, and may be used for that purpose.

Dr. Thompson During the progress of Dr. Patterson's investigation of the catarrhal nature of pyorrhea, I was also making observations and reporting to him. There are some cases that I recall,—one particularly, of a young man, a printer, who had allowed his teeth to get into a bad condition. He had for some time been seriously affected with catarrh, although he had never been treated for it. I directed him to apply to a physician, but he declined to do that; and I then directed him to use a douche, with the ordinary solution of salt for cleansing his nose, which he used with some benefit, and in the meantime I treated the pyorrhea simply by cleansing and astringents, and in a short time both the pyorrhea and the catarrhal condition showed marked improvement.

Bleeding of the gums often occurs in pyorrhea, and is one of the most marked indications of its catarrhal nature, as this is nearly always accompanied by catarrh of the nasal passages. To some persons I have suggested the possibility of catarrh being present when there was pyorrhea, and upon consultation with physicians have found that such was the case. Some time ago I witnessed a clinic of Dr. Templeton, of Pittsburg, who is an advocate of the use of copper sulphate, or common blue-stone, of full strength, which he pulverizes and applies directly in the pockets in the gum in the treatment of pyorrhea. He claims to have had wonderful success with the remedy. He makes applications about once a week, in the first instance, and follows it up with astringent and healing washes.

Some time since I conceived that pyorrhea might be indicative of renal disease, and in cases where I suspected such disturbance, directed the patients to consult their physicians. Sometimes slight trouble in that way was found, but not frequently enough to make a theory; and when in later cases which had diabetes very decidedly I found there was no pyorrhea, but only an ordinary amount of calculus, I was forced to abandon that notion. Then I began to notice its catarrhal nature, and I am now convinced, through Dr. Patterson's investigations, that that is the correct theory of the disease; and that if it is studied and treated from that stand-point we shall have greater success in its treatment.

In the use of cocaïne, I have met with some successes and with some failures, but I found that it required too much time to be used as a constant remedy. I think that it is reliable, but the time required makes it impracticable for ordinary purposes.

Dr. King. Having given considerable attention to the treatment

of this disease during the past eight years, I desire to say a few words and read a few cases from my record of those treated. My theory is that calculus is the immediate cause, first producing inflammation of the gums and peridental membranes, and finally absorption and suppuration.

The theory that pyorrhea is a constitutional disease, or the result of an impoverished condition of the blood, in my judgment, cannot be sustained by a reasonable symptomatology or the facts so plainly present in the cases themselves. Many of the cases which have come under my observation have been patients of general good health, many of them robust and vigorous, either in prime of life or but little past. In refutation of the theory that this disease comes of an impoverished condition of the blood, I will cite a few cases from my record:

1st. Mr. D., aged thirty-one years; general health good; occupation, druggist; number of teeth in the mouth twenty-six, all more or less diseased, many of them quite loose; exudation of pus from gums quite general; usual accompaniment of calculus; absorption of the alveolar process quite extensive; patient attributes the cause to mercurial salivation while being treated for bilious fever some fifteen years previous.

2d. Mr. J., age forty-six; says, "I was never sick a day in my life"—which is corroborated by appearances, he being robust and ruddy, and weighing one hundred and eighty pounds; six teeth gone, victims of this disease; the other twenty-six badly affected.

3d. Mrs. M., "fat, fair, and forty;" has enjoyed excellent health through life; never had any sickness save that incident to maternity; all of the teeth in position, and nearly all affected by the disease—one so badly that I removed it. There was no sign of caries in any of the teeth excepting two or three small fillings, which were inserted many years ago.

4th. Miss S., age about forty-five years; was never sick in her life, never employed a physician nor took a drop of medicine, pill or powder; twenty-two teeth in position, the others lost through this disease; all remaining ones more or less affected, two entirely without osseous support; a slight deposit of sanguinary calculus present.

These four patients have been selected out of the twenty-three treated as the most perfect in their physical condition, and I think show an average per cent. of such found among an equal number of average humanity not afflicted with the disease in question.

Now, if this disease is not the result of salivary deposit, why is it that those theorists who deny it are so particular to instruct their patients as to the care and cleanliness of their teeth, lest the disease return? And why are those who hold to the theory of salivary

calculus being the cause successful in curing it by simply surgical and local treatment?

True, not every case of pyorrhea, when brought to the notice of the dentist, is accompanied by salivary or serumal deposit, but nine patients out of ten of these will tell you that the beginning of their trouble was tartar upon the teeth. Why is it not found there now? Because some systemic change has taken place by which these salts are no longer a product of the saliva.

> "The foe though gone, his track is here,
> Behold the wound where thrust his spear."

Dr. Ingersoll. Perhaps I may as well here as anywhere else correct a statement which has got into the journals a number of times, and recently from Dr. Rawls, of Kentucky, in the *Ohio State Journal*, on the subject of pyorrhea alveolaris. I have been quoted as saying that the cause of pyorrhea alveolaris is the gathering of sanguinary calculus on the roots of the teeth. Any one who will read my paper, published in the *Ohio State Journal*, on the formation of sanguinary calculus, will find that I distinctly stated that it is never the cause of ulceration, but uniformly the result of it.

Dr. Friedrichs. I would like to inquire whether any of you have ever seen a considerable deposit of salivary calculus without its producing any irritation or pyorrhea? One or two cases have come under my eye,—one in which there is a considerable deposit. The subject is an Englishman, who would not allow any dentist to touch his teeth. He said they had been in that condition for the last twenty-five years, and I could not see that there was any inflammation produced by the deposit, as his gums below the deposit appeared in a normal condition.

Adjourned to 8 P. M.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held its regular meeting, Tuesday evening, October 13, 1885, in the parlors of the New York Academy of Medicine, No. 12 West Thirty-first street.

The President, Dr. William Jarvie, in the chair.

President Jarvie delivered the following address:

Gentlemen: It seems but proper that at this meeting of the New York Odontological Society, marking as it does a new era in its history, your president, in calling the assembly to order, should say a few words regarding its past, and his hopes and anticipations for its future.

On the evening of Thursday, May 30, 1867, Drs. Francis, Northrop, Carr, Hurd, Perine, Horne, and Burgh met at the residence of the first-named and organized this society, the avowed object being "to cultivate closer professional relations among its members; to extend their knowledge of the arts and sciences bearing upon dentistry; to maintain a high standard of excellency in dental art; to interest and instruct the public in dental hygiene, and to secure a higher appreciation of the aims of the dental profession."

The membership of the society was quite small, but it was composed of men thoroughly imbued with the principles they had thus avowed, and they set themselves earnestly at work to carry them out. They divided themselves into committees or sections, very much as the New York Academy of Medicine is organized to-day, one of these devoting its time to research in the direction of dental pathology and therapeutics; another to dental anatomy and Physiology; another to dental histology and microscopy; another to dental chemistry and metallurgy; another to operative dentistry; and still another to dental education and literature, these committees or sections reporting the results of their investigations from time to time to the society.

During the first five years of the society's existence the papers read were all prepared by the members; thus confining the work and its influence largely within its own membership, which was small, never up to this time exceeding twelve or thirteen.

In June, 1872, Dr. Norman W. Kingsley, of New York, prepared a paper describing a case of compound fracture of the inferior maxilla and its treatment, which was the first paper read before the society by one outside of its own membership. Since then, however, the list of dentists who have contributed papers to the society is very large, embracing as it does the name of almost every one of eminence in the profession in this country, and the names of many who are practicing in Europe. Among them I might mention the late Prof. Robert Arthur, of Baltimore; the late Prof. T. B. Hitchcock, of Boston; the late Prof. J. H. McQuillen and Prof. T. L. Buckingham, of Philadelphia; Prof. J. E. Garretson, Louis Jack, W. G. A. Bonwill, C. N. Peirce, J. Foster Flagg, and E. T. Darby, of Philadelphia; G. T. Moffatt, L. D. Shepard, Thos. H. Chandler, E. S. Niles, Thomas Fillebrown, and J. T. Codman, of Boston; Geo. H. Cushing, M. S. Dean, A. W. Harlan, and T. W. Brophy, of Chicago; Edward Maynard, Washington; G. V. Black, Jacksonville, Ill.; S. P. Cutler, Memphis; Chas. E. Butler, Cleveland; H. S. Chase, St. Louis; S. B. Palmer, Syracuse; J. E. Line, Rochester; Chas. S. Tomes, J. Smith Turner, C. Spence Bate, Thomas Fletcher, Geo. W. Field, W. H. Waite, and H. C. Quinby, of England; G. N. Winderling, of

Milan; Madame Hirschfeld, Berlin; and the list would not be complete were I to leave out the names of our New York friends, W. H. Atkinson, J. B. Rich, D. H. Goodwillie, James E. Dexter, Louis Elsberg, C. Fayette Taylor, and Carl Heitzmann.

This list of names is so long and so imposing that it would seem as though the contributions of our active membership had indeed been small in comparison; yet when I call your attention to the very able and learned papers read by such as our own Abbott, Bödecker, Bogue, Bronson, Brockway, Carr, Clowes, Dwinelle, Dodge, Francis, Howe, Ives, Kingsley, Lord, Marvin, Payne, Perry, and Raymond, you will realize that our *resident* is indeed an *active* membership.

During the past eleven years three unusually large meetings or congresses of dentists have been held under the auspices of the society. They were productive of much good, bringing together as they did the ablest men in the profession, from various parts of the country, for the full and free discussion of the different subjects brought before the meetings. Each of these meetings seemed to instill new life and vigor into the society, and they have been the means of inspiring many to venture into new fields of original investigation. I trust we may have more of them.

Up to the close of 1873 the society did not undertake the publication of any of its proceedings. During 1874 the recording secretary prepared a synopsis of the discussions, which, together with the papers read, were published in *Johnston's Dental Miscellany*. Since December, 1874, all of our discussions have been reported verbatim, carefully revised, and, with the papers read, published (with the exception of one year) in the DENTAL COSMOS. At the close of each year the transactions of the society as published have been collected and bound in a volume, and copies sent to all our members, and to the various dental libraries. These volumes, as you all know, have been eagerly sought for and read, and the fact that they are so frequently quoted from as authority leads us to infer that they are valued highly for their contents.

I said in the beginning of my remarks that this evening marked a new era in the history of the society. Heretofore the society has always held its meetings (with the exception of the congresses before referred to) at the residences of its members, the society believing that up to this time it was for its best interests to do so. We have had in this way an opportunity of observing the manner of the arrangement and mode of fitting up of various offices; we have seen various plans of lighting operating-rooms; the different instruments and appliances in use; and last, but not by any means least, there has been a certain cosy, fraternal, home-like, and social atmosphere pervading our meetings that has recommended itself

strongly to many. But the time has come, so the majority of our members think, when larger accommodations are needed, where all can meet on a common plane; where some can exercise a greater freedom of utterance in the discussions than they feel like giving vent to in a friend's house, and where all can share alike the burden of expense.

This brings us to the present of the society. What shall be its future? Much as the society has accomplished, brilliant as is its record, strong as it stands this evening, honest, earnest, hearty work must be done in the future to sustain it. We need a library filled with every work useful for reference. We need a cabinet filled with specimens. We have waited for both, because we have heretofore had no abiding place for either. The cause of our being without them no longer existing, let the want be supplied speedily.

How shall our meetings be made more interesting and instructive? Bring here the record of your histological research; the record of the pathological conditions you meet with; your treatment and its effect; your new instruments and appliances; your interesting cases of office practice. Come each one with thoughts intent upon the subjects announced for discussion, and give voice to them. Let this be truly a mutual-benefit society, each one contributing in some way to the general fund of instruction.

And now, fellow-members, I appeal to you to keep up the standard of this society, whose reputation and whose work is dear to the hearts of all of you, not for any narrow aim or selfish end, but that through our efforts the standard of professional attainments may be raised, and the sphere of usefulness of our profession extended, that through it suffering humanity may be the better and more quickly relieved.

Gentlemen, as I have already said, we meet for the first time in a new home, and we are proud to have with us this evening the honored president of the New York Academy of Medicine, Dr. A. Jacobi, who will now address you.

Dr. A. Jacobi. Mr. President and Gentlemen: A few months ago, when delivering an inaugural address before the New York Academy of Medicine, I invited the numerous medical societies of the city to recognize the Academy building as their natural headquarters. Since that time, besides the academical sections which belong here, a number of scientific societies have convened here regularly, thereby giving proof of their kinship, not only by similar studies and equal tendencies, but by availing themselves of the same halls. To-night I have the pleasure of greeting here the representatives of dental medicine and surgery, which longer than any

other special department has kept separate from general medicine. Why was that so?

Like medicine in general, dentistry has a single great aim, viz., to cure disease or to prevent it. In its first beginning medicine consisted of a number of devices, rules, and means to restore health, collected nobody cared from what source. After a long time only it became a physical, intellectual, and moral necessity to *prevent* disease as well as to remove or relieve it. Thus, the practice of medicine preceded its science for hundreds, perhaps for thousands, of years. Necessity was the mother first of gathering plain experience, and but afterwards of "invention" and of more profound thinking. We all know that genuine scientific research is but the product of comparatively modern times; but also that there is no investigation ever so subtle and apparently remote from practical utilization but serves at last the aim of medicine,—that is, prevention or cure. Thus, medicine consists legitimately of two parts, viz., art and science. The former was perfected to a certain extent before the latter had any opportunity to develop. The former was, as I said, a requirement, a necessity; it served both the public and the experts. It cured the sick; it gave the physician prominence, reputation, and reward. Pure science and purely scientific work cannot accomplish the same results for their priests unless society has progressed beyond its most pressing physical needs, and until for the universal drudgery in behalf of the body is substituted a high degree of general intellectual culture.

I take it that what I said of medicine in general is particularly adapted to that branch of the healing art to which you, gentlemen, are giving your more or less undivided attention. The field of labor of the early dentist was a very limited one. Not only was the part of the human body to which he administered a very narrow one,—the very type of a special and specialistic province,—but his services were very uniform and simple. For a long time the art of the dentist was that of extracting teeth, no matter whether performed in the public market-place, or in later periods in the barber's workshop. The art of preserving and beautifying is of comparatively recent origin, and requires as its foundation a good deal of knowledge, acquired by patient study, undertaken with a scientific spirit. Fortunately, to-day both medicine in general and all its special branches combine both science and art, each of them subservient to and perfected by the other.

Knowledge in regard to teeth was first descriptive; general anatomy cared for them as for any other organ; comparative anatomy paid most attention to skull and teeth. I remember very well that when I was quite young I had to learn by heart the number,

shape, and position of the teeth of many more monkeys than I know the names of to-day. Before and from the time of "The Natural History of the Teeth," by John Hunter (2d ed., 1778), or Nasmyth's "Researches on the Teeth" (London, 1839), to the present day, the teeth have shared the care and study of the anatomists of all countries. If, beside those I have enumerated, I were to pick out the names of such men as have done most for the anatomical knowledge of the teeth, I should mention Leuwenhoeck (1678), who discovered the spiral dental canaliculi; Purkinje, Arnold, Goodsir, Mareusen, Kölliker, Waldeyer, and Charles S. Tomes. By them the accurate histology of the teeth has been studied in addition to their coarse anatomy.

Chemistry has also come in for its share of work and result. The teeth of man and animals,—old and young animals,—diseased and healthy teeth, became the subjects of exact analysis, with which the names of Berzelius and Lehmann are intimately connected. But comprehensive knowledge of the living organism or any of its parts is not possible without acquaintance with its development. Modern medicine is built up, to a great part, on embryology. Many of the diseases of the young and old, and anomalies of structure and function, are best explained by the history of the embryo and fetus. Now, in dental science the study of embryology has been as fertile as in any other branch of medical knowledge. Since Goodsir and Arnold first explained the dental follicles by cutaneous vesicles, connected with the oral mucous membrane (or rather its epithelium) of the embryo from which they are duplicatures, immerging into the developing jaws, in which thus grooves are formed, many of the arrests of development and diseases of the teeth have found their explanation in the numerous results of the patient researches of embryologists. Among the more prominent facts known to all is, for instance, the absence of teeth and the consequent smallness of the bone. The existence of maxillary cysts and the presence of bones and teeth in them finds its ready explanation in embryological data. Amongst the tumors it is principally odontoma which owes its origin to an embryonal maldevelopment of the dental pulp. Nor is it at all improbable that Cohnheim is correct in many instances with his theory that all the malignant tumors of later life are due originally to improper retention and defective evolution of embryonal cells. In that case the embryology of the teeth and jaws would have to account for sarcoma. fibroma, myxoma, carcinoma, and osteoma, in connection with those organs.

Besides these growths, the embryo and fetus are responsible for a great many changes in the appearance and condition of the teeth of the infant and adult. Fetal diseases, such as syphilis, affect the teeth forever. Now, it is true that Hutchinson's doctrine in

regard to the peculiar shape of the permanent teeth of children born with hereditary syphilis is greatly exaggerated; but early decay, friability, diminutive size, ragged appearance, and speedy decay of the temporary teeth of syphilitic infants are positive facts. Premature ossification of the cranial sutures and fontanels, whether completed or not before birth, exerts a lasting influence on the protrusion and development of the teeth. Not only will they appear long before their normal time, but the order in which they appear is changed. In nine out of ten such cases, before and since I first wrote on the subject of premature ossification, in 1858, I found the upper incisors to come first, and the number of teeth before the first year of life is completed to be in excess of the usual figure.

The diseases developed after birth have a great influence on the teeth. The transparent teeth of the consumptive; the friability of the teeth after serious illness, such as typhoid fever, which reminds one of the rapid shedding of their kin, the hair; the horizontal marks on the teeth, either temporary or permanent, which are due to diseases undergone at the time when that particular tooth or set of teeth was in process of rapid formation and protrusion, so that a serious illness can be known to have existed at a certain period of life,—all these circumstances point to the most intimate connection of the dental organs with the human organism. Let me add only one instance, viz., the influence that rachitis has on both teeth and bones The cranial sutures and fontanels will close late; the protrusion of the temporary incisors is greatly retarded, or interrupted; the teeth are small, soft, and friable, and easily decayed. It is only the permanent teeth which, in the process of eburnification of the whole osseous tissue during the protracted recovery, are large, hard, solid, and yellowish. Both jaws (but particularly the lower) are of small or diminutive size compared with the large skull; the lower jaw does not reach the normal line, and is rotated so that the teeth are turned inwards. All these changes form an important part of pathological anatomy, one of the best studies of which that I am acquainted with is the "Atlas of the Pathology of the Teeth," by Heider and Wedl. Perhaps, however, for the practice of your special profession the direct lesions of the tooth are of the greatest importance. Both caries and necrosis require the special study spent on the same processes when occurring in other living tissues. In this respect, as in many others, the dental specialist shares the interests and requires the study of the general physician and surgeon.

In regard to many other questions, it is the same. Is there a dentist who would be satisfied with the fact that teeth will fall out in advanced age? There is none who can do without understanding the process of the ossification of the pulp, the nature of the athero-

matous obliteration of the small arteries, and the occlusion of the canaliculi of the dentine. Nor is there any one who could do without the exact knowledge of the histology of the gums, if he means to have an explanation of the fact that follicular stomatitis will not affect the gums, but that they will easily be destroyed by the ulcerative process first described by Tonnelet.

If I have spoken of normal and pathological anatomy, of embryology and surgery, I ought not to forget the direct connection dental art and science have with so-called internal medicine. It implies a great deal of general study, both anatomical and pathogical, on the part of a medico-dental man to give an account of those cases in which dental diseases were resulting in amaurosis or suppurative meningitis, or where the simple extraction of a tooth was followed by dangerous or fatal hemorrhage. What is its diagnosis in an individual case? Is there an aneurism of the infra-maxillary artery or a branch? Is it a case of hemophilia? Grandidier has collected twelve cases in which this peculiar disposition to bleeding was the cause of death after extraction. Let me allude, finally, with a few words only, to a subject of vast interest to everybody, male and female, old and young,—particularly the young; the old, too, it is true, for the question of the so-called third dentition of the old and superannuated is perhaps not yet settled to everybody's complete satisfaction. The young, however, are mainly interested in the question of the first (also the second) dentition. Is there any disease or ailment which has not been connected with the poor little teeth both inside and outside the jaw? Everything in the mouth, from the erosion and ulceration of the frænum of the tongue, resulting from friction over the sharp, isolated two central lower incisors during whooping-cough, to follicular stomatitis, pharyngeal abscess, and enlarged tonsils; everything from coated tongue to cholera infantum, epidemic dysentery or intussusception of the bowels; from colic to convulsions; from sore ears to curved limbs,—everything has been attributed to dentition. If it were true, it would be the most pardonable of all pious wishes that nature might not supply us with that dangerous gift at all, but trust us to the gentle care of the modern dentists, who will supply teeth without diarrhea, pneumonia, and convulsions. The question of dentition is really a very serious one, and deserves the closest attention of every one of us. Superstitions in medicine will not die out, or will die hard. One of the worst is the readiness with which both ignorance on the part of the public and incomplete diagnoses on the part of the practitioner contribute to the permanency of the error which explains every disease of infancy and childhood by the influence of teething. You, Mr. President and gentlemen, who are correctly supposed by the

public to know all about teeth and teething, will have it in your power to gradually eradicate that prejudice, which is as dangerous as it is ludicrous. To our successors many of the present beliefs will appear as preposterous as we deem some of those of past centuries on this subject. Of these let me give a single example before I close. In 1595 Dr. Jacobus Horstius wrote a book, "De Aureo Dente Maxillari Pueri Silesii." This golden tooth in the maxilla of the Silesian boy was accepted as sacred truth. It was unheard of before, but it was considered a fact. "The innate heat of the body and the earth had produced that tooth. The gold is deposited by the veins supplying the cavity. The golden tooth grows out of the bony root. The gold in the tooth is nourished, lives, and feels. The golden tooth is held tight by the soft gums;" and so on through a long string of sentences. What I here report is not a joke, but an extract from a serious book, written in a time when no gold was dug into teeth as nowadays, and no gold was dug out of practicing on teeth. Like that instance of three hundred years ago, much of the present orthodoxy in regard to teeth and teething which is still preached and believed will be stowed away in future with the golden tooth of the Silesian boy of Jacob Horst, M. D.

Mr. President, in this little sketch, which was indeed meant for the purpose not of teaching but of proving to you that I am aware myself of the importance of your studies, and the close connection of medicine and dentistry, I have alluded to a few points only. Indeed, to-day there is hardly a subject of great pathological, histological, or biological import which does not belong to the domain and form part of the necessary education of a cultured gentleman who studies and practices dental medicine and surgery. As a last word, I may be permitted to mention only bacteriology. Leptothrix, oidium, the fungus of that most destructive disease, actinomycosis, —they claim your attention and fears as much as ours, even from an immediate practical point of view. Thus, if I understood the tendency of the time at all, and the scientific needs and tendencies of all cultured men in general medicine and its branches, I should say that dental science is one of the roots of a stem, one of the branches of a tree,—general medicine. And as the old philosopher said of himself, that nothing human was foreign to him, I should say that to the scientific and practical odontologist nothing medical is foreign.

Dr. J. Smith Dodge, Jr., in reply, said: Mr. President and gentlemen, when one has to speak as the mouth-piece of others, he will naturally feel a little embarrassed by the duty, and while I have something of that feeling with regard to a part of what falls to me

this evening, I am happy to begin with words in which I have no doubt all who are here will heartily join,—that is, in expressing the gratification which we feel at the courteous welcome extended to the Odontological Society by the president of that larger society in whose rooms we meet to-night for the first time. There are dentists who have no care to hold any wider connections than that which binds them to the mouths of their individual patients; but as death swings his scythe and gathers in the harvest I am happy to say that the number of these grows smaller and smaller, and I think that very much the largest part of us really feel ourselves to be, and are glad to be recognized as being, cognate members of the great medical profession. Dr. Jacobi has stated how it is that in the course of things art necessarily precedes science. It has been eminently so with dentistry. So much of that which falls to us to do in relieving and preventing the suffering of mankind through defects of the teeth is of a mechanical nature, that it is not strange this has seemed for long years to constitute dentistry. It must have been so by the nature of the case. One cannot leave a suffering fellow being to writhe in anguish while one sits down to look through his microscope, or consult his books, or make some chemical test. The first thing to be done is to relieve this human need that comes to us, and after that we may sit down and study out the case and see what, in the largest light of science we can throw upon it, it means, and how in other cases the like may be prevented. So art with us has come first.

Then there is another point, which it did not occur to the doctor to bring in. I remember that Mr. Huxley has somewhere defined the process of scientific investigation to consist of three steps: first, the observation of facts; second, the mental arrangement of those facts, with conclusions as to their relations to each other and their meaning; and, third, the testing of all these conclusions by going back again to the facts. Similarly, the dentist finds not only that the first demand is for the exercise of his art in the way of immediate relief or prevention, but that when, having done this, he has proceeded to deduce his scientific conclusions and to make the deepest and widest investigations he can, it becomes necessary for him again to go back, if not to the exercise, yet to the objects of his art, to verify or to overthrow the scientific deductions which he had made. So we are to-day, and we always must be, more of mechanics, perhaps, than any others who have part in the great duty and blessing of relieving the ills and defects of the human body; we are and always must be tied to these material objects, limited in number and circumscribed in the locality which they occupy; we are tied down to manipulation and to observation of the teeth *in situ*, and we

are not permitted to roam very far in the fields of abstruse deduction before it becomes necessary to turn back again to the teeth themselves, and in the visible phenomena of their diseases, or of their orderly development, or equally orderly wearing out, seek a confirmation or refutal of that which we had deduced from previous experience; and, because the dentist is so tied to his teeth, there are some within our ranks, and many without, who raise the question whether it is not presumption to speak of ourselves as a part of the great medical body. We must be content to let the slur pass by. The fact that the dentist has to deal with the peculiar kind of human organ which calls more for the mechanical operator's interference than any other part of the body, is not a fundamental fact that should necessarily lower our usefulness, or define our standing, or cut us off from other relations. If any one had such a notion, the admirably chosen and charmingly presented remarks of the president of the Academy of Medicine to-night might stand as a sufficient refutation of it. But the fact is we are all aiming at one thing. Here are men and women and children with bodies fearfully and wonderfully made, composed of a great variety of organs, so blended together that if one member suffers all the members suffer with it; and it requires the services of a very large number of careful, skillful, earnest, serious men to combat the troubles and difficulties which human flesh is heir to; and whether the man test urine, or trephine a skull, or pass a catheter, or prescribe a regimen for a sick room; or whether he seat you in his chair and remove a decayed portion of a useful tooth, and put something else there that will restore the organ to its former integrity,—whether he does one of these things or the other, what difference does it make? If the well being of all parts of the human body and the proper performance of all its functions in this world is worth having, then the question only needs to be asked, Are these men ministering to that or not? If they are, they are members of the fellowship who minister to it in all the various ways known to the great science of medicine.

Perhaps this is too long a statement of what seems so plain. Nevertheless, one often has the fact forced upon him that just such an explanation needs to be made. Let me in conclusion say, that while we are glad to be so cordially received not only into the rooms but into the fellowship of our brethren of the Academy of Medicine, we feel at the same time that those who claim to occupy a position in the ranks of scientific medicine, no matter what that position may be, take upon themselves a large responsibility. I am not sure how far, but I am sure that very far, I speak the sentiments of all who are here, and of all the better portion of the dentists throughout

the world, when I say that every year there grows more upon us the impression of the absolute necessity for a knowledge not only of dental art, but for the mastery and familiar application of all science that in any way has a bearing upon this art, or upon the objects of this art. We are ashamed to have it thought that we merely manipulate the dental organs; to have it supposed that it is enough for us to make a trade of our daily operating, and then cast it out of our minds and give it no further thought. We are ashamed to have that supposed, not because we feel that it is true, but because we feel that the supposition does us wrong. This society had its origin, and has its continued existence, in the effort of dentists to know all that may be known which has any bearing upon our work; that is to say, to add science to art. We do not care in what quarter of the world or in what branch of human science some new discovery may be made; we only care to know that, coming from the East or from the West, from the North or from the South, from things familiar or things wholly new, here is something born yesterday and announced to-day, which has an application to the dentists' art,—another item added to that science which, while it comes after our art, is nevertheless the mistress of our art. Follow the history of dentistry for the last twenty-five years, and you will see that there is no body of men who minister to the necessities and diseases of the human body who more readily welcome and grasp whatever, in any of the branches of science, may possibly contribute to the better performance of their function.

Mr. President and gentlemen of the Odontological Society, if I have grown warm and boasted too much, forgive me. The boasting is at an end. You laid upon me this pleasant task of responding to the welcome of the evening, and while I had arranged in my mind such a response as I thought might befit the words of welcome that would greet us, I found, as I sat here, that the welcome was so much more cordial and prolonged and broadened than I had fancied it might be that I have run away from my preparations; but if I have spoken with more warmth and at greater length than I had intended, I hope I have only spoken the thoughts of your minds and the sentiments of your hearts.

Pesident Jarvie. Gentlemen, we will now hear from Dr. John A. Wyeth in regard to some operations upon the mouth and jaws.

Dr. Wyeth. Mr. President and gentlemen, when I was invited to come here and present some cases of surgical operations upon the mouth and jaws, I looked over my note-book of the last twelve months in order to select some typical cases of lesions of the palate, tongue, upper or lower jaw, that might interest you, and I will briefly report eight operations. I shall not take up much of your

time, as I desire you to look at the cases rather than to be talked to about them, because with respect to diseases of the buccal cavity you undoubtedly know as much as I.

Case I. This young lady, nineteen years old, had a congenital cleft in the palate, and grew up with a bad articulation and faulty pronunciation, her speech having the nasal sound or twang so common in these cases. When I first saw the patient, last April, the hydrochlorate of cocaïne was being introduced as a local anesthetic, and I determined to try it in her case. With a camel's-hair brush I applied a four per cent. solution every five minutes for half an hour, painting it upon the edges of the fissure and over the entire arch of the palate and fauces. Complete anesthesia of the parts was obtained, and a greater degree of toleration in the muscles of the palate than I have ever been able get with other anesthetics. We know that the reflex movements of the palate cannot be completely controlled in ether or chloroform narcosis, but in this instance, with the patient's volition aided by the cocaïne, the control was perfect. The patient held the tongue-depressor, and was of great service to me and Dr. Wardwell, who assisted. The edges of the cleft were freshened, the sutures introduced and tied, and the palato-glossus, palato-pharyngeus, and levator palati muscles of either side were divided. In cutting these the patient experienced some pain, because I was working outside of the zone of local anesthesia. The union was perfect—as you see!

Case II was almost analogous to this, excepting that it was complicated with an osseus fissure, for the closure of which the periosteum was lifted and slid to the median line and sutured,—the result being union throughout.

There are some men in your profession and in mine who are doing good work in remedying these deformities of the palate, and I may state that there is considerable difference of opinion between them in regard to the propriety of the operation. I have only operated upon two patients for cleft palate, and those were during the last twelve months. Both operations have been successful; and while I do not claim any great credit for success in this branch of operative surgery, there is one feature in connection with these cases that encourages me, and that is the improvement in articulation. When I first spoke with this little woman I could not understand one-tenth of what she said. Now I can understand everything she says; and her friends, who are better able to judge than I, appreciate the fact that there is a marked improvement in this respect.

I will finish this subject by showing you these instruments, for which we all are indebted to a member of your profession,—my good friend, Dr. Goodwillie,—and I consider them the perfection of

instruments in the surgery of the palate. The fact is that, if I have stolen his thunder, I have armed myself with his instruments, and tried to get some credit by using them successfully.

Case III. This man I operated upon a week ago to-day, in my ward in Mount Sinai Hospital, for cyst of the antrum. Two years ago he first had pain in the region of the antrum of Highmore, and went to some dispensary, but was not treated particularly for that, and it went on until July last, when he came into the hospital. A colleague of mine made a puncture in the antrum of Highmore in front of and above the anterior upper molar that discharged a little fluid very much like the white of an egg. His diagnosis was a cyst of the antrum of Highmore, but he did nothing more at that time. The disease progressed, and gave the patient a great deal of annoyance and no little pain. A week ago the patient was etherized, and I made an incision from the corner of the mouth to the angle of the jaw, passing parallel with and below the duct of Steno. I then extracted the two bicuspids, and with a gouge removed a portion of the anterior wall of the antrum. The cavity of the antrum was then packed with iodoformized gauze. The wound in the cheek was united by first intention. My hope was to destroy this cyst by the process of inflammation. If this primary operation does not succeed, I will have to remove a greater part of the upper jaw and dissect out the cyst-wall.

Case IV was that of a lady twenty-three years old, who had had an abscess in the antrum of Highmore for thirteen years. I drilled into the cavity through the place from whence the anterior molar had been extracted, and found pus. The cause of the abscess was found to be an extra tooth lying loose in the antrum. I removed it and the patient was rapidly cured.

Case V was that of a boy six years old, with necrosis of the left lower jaw near the angle. A large piece of bone was removed and a cure effected.

Case VI I think is one of more interest to you. This boy came under my care a year ago. He had at that time a little tumor growing upon the anterior part of the alveolus, which was suspected of being a sarcoma, and upon examining a little of it under the microscope I found it was. The little fellow was anesthetized, and I split his lip down through the median line; made an incision around to the angle of the jaw, and removed about two inches of the bone. What is astonishing to me, and anatomically interesting, is the fact that the opposing parts of the upper and lower jaws are in perfect line, and in masticating he brings the upper and lower teeth together, although no prosthetic apparatus has been inserted.

Case VII. This young man had a tooth extracted from the left

side of the lower jaw in 1883, and soon after that an abscess formed just opposite the point where the tooth had been extracted. Six or eight months after the tooth was removed he called upon me to treat the abscess, which had been opened. All I did at that time was to put a dressing on it and send him to the country. When he returned the abscess was entirely healed, and it gave him no further trouble until about six weeks ago. A month prior to that date he noticed that a swelling was occurring in the same place as before, and by the time he arrived in New York City the second abscess had opened spontaneously. Last week I etherized him, and cut out all the diseased tissue. I went down to the bone, not doubting that I would find an abscess cavity in the lower jaw; but although I exposed the bone in front and back of the place where the tooth had been extracted, I did not see a sign of necrosis.

Dr. Abbott. What tooth was extracted?

Dr. Wyeth. The anterior molar.

Dr. Abbott. How old is the patient?

Dr. Wyeth. Twenty-one.

Dr. Abbott. Had he ever lost a tooth from that side before?

Dr. Wyeth. He says not.

Dr. Abbott. There may be a wisdom tooth back there, doctor.

Dr. Wyeth. I think not. I examined the jaw thoroughly.

Case VIII was a man from Western New York who came under my care a year ago for tic-douloureux in the left inferior dental nerve. I trephined the jaw at the angle and extracted a half inch of the nerve. The patient was immediately relieved, and at last accounts was well.

Dr. J. Morgan Howe. Mr. President, I have been very much interested in the presentation of these cases by Dr. Wyeth, and I feel like asking a great many questions regarding them, but will limit my queries to one or two on the subject of cleft palate. The doctor says he has operated upon but two cases, but I am sure he must have studied the subject a great deal, judging from the beautiful results, surgically considered, that we have witnessed to-night. Will he kindly tell us of his experience with regard to the degree or amount of improvement in speech. I believe none of us heard this young lady speak; and I would like to ask him how much improvement there is, how much may be expected, and what estimation he has for these operations as a remedy for the defect of speech incident to cleft palate; also, whether there are any indications that would contra-indicate operations for cleft palate. I think the doctor can enlighten us some if he will be so kind as to give us his ideas on this subject.

Dr. Wyeth. In regard to indications for the operation, my experience is, as you know, very limited, and I am not really *au fait* in the

mechanism of the subject. I think there is great justification for operating when the cleft in the palate causes regurgitation, and the food and everything that is swallowed creeps through the pharynx and along the passages of the nose. It is not a pleasant thing for people to eat through their noses, and this is what some of these unfortunates do. Another justification for operating is found in the improvement in speech. I believe, from the cases I have seen, that there is much less indication for procedure in the case of a child that has passed the second year of life than before; for if it can be done before that age they learn to articulate better, as in cases of later operating the patient has to unlearn the bad articulation they have acquired. The only contra-indication is the danger to the patient's life during the operation. If I thought I was endangering the life of a person, I would let him eat through his nose as long as he lived before I would take up the part of his executioner.

Dr. Abbott. Is there a point at which you would advise the putting in of an artificial appliance rather than operating?

Dr. Wyeth. I do not think there is, doctor; but when I say that, I do not speak by the card. My friend Dr. Kingsley knows more about that in a minute than I would know in a century, and I would prefer to take his opinion in regard to artificial apparatus. I think I have never heard a person for whom he had made an artificial apparatus speak; but I am so well satisfied with what I have done with these instruments of Dr. Goodwillie's that I am going to use them as long as I can get victims.

Dr. N. W. Kingsley. Mr. President, I am sorry the gentlemen who just sat down made that last remark. I had hopes that, upon seeing better results in the treatment of cleft palate than he had obtained in his two cases, he would change his mind, and rarely if ever operate again. But to say that because one of my confrères has invented some instruments which enable him to accomplish an operation easily (and, by the way, I think it little credit to the gentleman that he ever invented those instruments); to say that because these instruments have been invented he is "going to use them as long as he can find victims," shows that he is not open to conviction. This subject and this meeting to-night has for me a peculiar interest. We meet for the first time under the roof of the Academy of Medicine, and we have had presented to us one case and have heard described another of the treatment of cleft palate by surgery; this conjunction of subject and place is particularly interesting to me, because I recollect that nearly twenty-five years ago, before this same Academy of Medicine, I presented two patients who had extensive cleft palate, who were then wearing artificial apparatus, and whose speech was absolutely perfect. I then described not only

my method of restoration, but I gave the reasons why, up to that time, a surgical opertion had invariably failed to benefit the speech to the extent of producing perfectly natural articulation. The reasons I gave were based upon the philosophy of the mechanism of speech, and were founded in science; they were accepted by the gentlemen then present, and they were after that indorsed by the most distinguished members of the profession in England and in France, and I think that, with few exceptions, they have been accepted and indorsed ever since. Only within the last month I received a letter from a distinguished professor in a German university, in which he stated that he had only recently seen a monograph of mine upon the mechanism of speech, telling me, among other things, that my investigations, which he regretted he had not heard of before, were far in advance of those made by any other scientist. There was nothing new in that monograph. I had given the same information over and over again; and to-day the most mortifying thing to me is to see that, although I have announced these principles repeatedly, and they have been promulgated many times, and published in nearly every language that has a surgical literature, it has been to so little purpose that we still hear, as we have heard this evening, professional men say they are not familiar with the mechanism of speech. Bear with me while I briefly re-state those principles. The natural palate hangs to the posterior edge of the palatine bone, a membrane or curtain which moves up and down. One of its offices is, by its elevation, in conjunction with the contraction of the pharynx, to close the passage to the nares. Another function is, in conjunction with the tongue, to close the passage through the mouth. Articulate speech, as we understand it and as we hear it, must of necessity come from a perfectly-formed natural palate and the perfect performance of its functions. If it be split, if it be too short, or if in any way it is unable to perform all its natural functions, speech will be imperfect, and always must be imperfect, so long as the palate is defective. You cannot get perfectly natural articulate speech from a defective palate. My friend will say, in answer to that, that the palate of the patient he brought before us this evening was not defective, because he had made it perfect. He has made it perfect in appearance, by drawing the sides of the membrane together and getting a good union down to the uvula. It is as good an operation as I ever saw, and I have seen scores of them. My observation has not been confined to one or two cases. I say it is impossible, in the very nature of the circumstances that exist, to bring the sides of the fissure together and have the palate long enough to reach the posterior wall of the pharynx. I have never seen a case yet where that was done. Drawing together the sides

of the membrane makes it short at the back. The patient exhibited here to-night showed exactly that condition. I wanted to get her to speak or read aloud to us, and she spoke in a low tone and said, "Not to-night." In speaking those two words there was the same escape of sound through the nasal cavity that my ear has become accustomed to detect. If I had not been told she was a cleft-palate person I would have known, simply by the articulation of those two words, that her palate was defective. It is true probably that she finds it easier to speak now than it was before, and she may speak some syllables better, but what we are seeking for is a perfectly natural articulation,—perfectly natural speech, from hearing which no one would suspect there ever was a defect in the palate.

When my friend was asked to state the objects of operating in these cases, he gave as one of the prominent objects the improvement in deglutition. I had that idea once, getting it from the books, but I questioned my patients, and they all told me they had no difficulty whatever in swallowing. Among them have been some of the most extensive congenital clefts to be met with in any practice. One gentleman came to me with a fissure in the roof of the mouth so large that he could stick his tongue out through his nostrils for half an inch. I asked him if he ever found any difficulty in swallowing. He said he had none at all; he never thought of such a thing. The explanation is this: Difficulty in swallowing occurs in infancy, but long before patients have reached years of maturity they have learned to manage their food and accommodate themselves to the circumstances, and deglutition is not interfered with to such an extent as to justify an operation, no matter how simple it may be. But to go back to the difficulty of articulation. As I said a few moments ago, *upon a thorough understanding of the mechanism of speech is based the whole idea and object of any treatment of cleft palate.* There is a possibility, as has been suggested by our friend, that if the operation is made in the earliest years of the patient's life, with the growth of the patient and the development of all the surrounding parts, especially with the stimulus he would get from the effort to articulate, the newly-formed palate may be increased in length, and a fair articulation made possible. My experience in meeting patients who have been operated upon by surgeons for cleft palate is such that I think, if my friend had the same experience, he would do as did our lamented friend, Prof. Little, who came before us a few years ago, and who died this last year. Dr. Little had been operating for cleft palate. We spent an evening together discussing the mechanism of speech, and subsequently he said to me, "I will never operate for cleft palate again." And he never did. The surgeon sometimes defends his operation by saying that, "if it does no good, neither will

it do any harm," but that is not true, because a successful surgical operation prevents any other method being adopted without undoing the results of the operation.

I would like to mention two cases, typical of many that I have seen, which have presented themselves within the last three months. A mother, a widow, came to me with her only son, a young man of about twenty years of age, to whom she had managed to give as good an education as he could acquire in the difficult circumstances in which he was placed by reason of his defective speech. She had gone to a surgeon about three years before and had his cleft palate operated upon. There was a good union, just as good as we saw here to-night, but his speech was not only no better than it was before, but his mother said (and the tears ran down her face as she said it), "I believe it is worse; and when I think what my son has suffered I cannot recall it without shedding tears. What can you do for him?" I answered, "Nothing at all." "But I have been told you can treat these cases, and bring about perfect articulation." "I cannot in this case." "Why not?" "Because the surgeon has sewed it up and put it out of my power." "Has he got to go through life like this?" "I think he has; I do not feel at liberty to cut it open."

Another young gentleman I took before the post-graduate school in July. He was a graduate of Yale College five years ago. At the age of seventeen or eighteen years he had his cleft palate sewed up by a surgeon in Baltimore, and it also was an excellent operation, excepting a small opening at the apex of the fissure, which was covered with a plate; but he could not speak any better than he did before. He said the defect in his speech prevented him from doing business, and he must have something done. The real difficulty, like all the other cases, lay in the palate being too short behind. I made a little apparatus to go across the roof of the mouth and pass through this opening, going over and down behind the palate, with a little flexible extension which simply elongated the palate and enabled a closure to be made when the palate was elevated. I was requested to give a lecture before the post-graduate class upon this subject, and I placed the instrument in the fissure for the first time before the class, and we heard him read from a newspaper. The change was very marked; his speech was almost perfect even then; and it was rather astonishing that it should have been. I have constantly to disabuse people's minds of the idea that speech comes at once from the introduction of the instrument. The patient must learn to use it before great improvement in speech can be expected. In the artificial apparatus they have the means of speech, and when they have learned to use it the desired effect will be produced. By

a surgical operation they do not get the means to make perfect, natural speech. There is where the difference lies between us. There are a few members of our own specialty who cannot plead ignorance as a justification for their operations upon cleft palates. They have heard the principles explained too often, have seen them illustrated, and know the true science of the subject. I can forgive a surgeon who comes before us and honestly says he does not know of these things when I can't forgive one of my own confrères.

Dr. Wyeth. I shall be very glad to see any of Dr. Kingsley's cases, and if after so doing I am convinced of the better results claimed for the mechanical over the operative treatment, I shall adopt it, but until that is thoroughly done I shall continue the practice and teaching of the men who have made the closure of cleft palate a triumph of surgery.

Dr. Abbott. Inasmuch as Dr. Wyeth was so kind as to present a number of cases here this evening, some of them of a very interesting nature indeed, I hope to have the opportunity, at some future time, of reviewing them, particularly those relating to the treatment of diseases of the antrum. I feel delicate about doing so to-night, as the time for adjourning has arrived.

Dr. Lord. Mr. President, we are certainly very much indebted to Dr. Wyeth for the very interesting discourse he has given us this evening, and for his trouble and kindness in bringing these cases to our attention. I am sure that all are pleased to join in giving Dr. Wyeth a most hearty vote of thanks.

President Jarvie. It gives me great pleasure, I assure you, to tender the thanks of this society to Dr. Wyeth for his presence here and for the presentation of these very interesting cases, which he has done certainly with considerable trouble to himself and to his patients, to whom we are under obligations also. I trust that Dr. Wyeth will be with us at some future time, when we can discuss the subject of diseases of the antrum.

Dr. Wyeth. I thank you very much, Mr. President, for this courtesy. I consider it a great honor to be invited to come before you. I think the relations between your profession and mine should be more intimate; that we should be better acquainted, professionally and fraternally, than we are.

President Jarvie. I want to say to our friends and guests that it is our custom, when cases are presented here, to discuss freely their merits and supposed demerits; and that we are discussing the cases and the methods followed, not the gentlemen who present them. I have also to say that, owing to the lateness of the hour, the reading of Dr. Brockway's paper will be deferred.

Adjourned. S. E. Davenport, D.D.S., M.D.S.,

Editor N. Y. Odontological Society.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

The First District Dental Society of the State of New York held a special meeting, Tuesday evening, September 22, 1885, in the rooms of The S. S. White Dental Mfg. Co., Broadway and Thirty-second street.

The president, Dr. William Carr, in the chair.

Incidents of Office Practice.

Dr. B. C. Nash. I have here a cast of the mouth of a patient, a young lady fourteen years of age, showing an unusual retention of temporary teeth and backwardness in the development of the permanent ones. In the upper arch are the permanent central incisors, bicuspids, and first molars; the lateral incisors and cuspids of the temporary set are retained, and the second permanent molars are still undeveloped. In the lower arch the six permanent front teeth are in position and also the first permanent molars, and on one side a second molar, but there is no indication of the appearance of the bicuspids, though the temporary molars on one side became loosened and were extracted about a year ago. The permanent teeth are generally of excellent quality, but much smaller than usual. I would like advice in this case, as I have heard of gentlemen who invariably extract temporary teeth when the time for their shedding comes. I have not extracted any of these teeth, and am inclined to await developments before doing anything in the matter.

(The opinions given were in confirmation of this view, and the matter was passed.)

Dr. W. H. Atkinson. Mr. President and gentlemen, I am about to present to you a paper which deals with a disputed point. I wish to invite your close attention, and I put you at liberty to stop me at a comma, semicolon, colon, period, or paragraph; and if I use a term that does not strike you as being relevant, stop me right there.

Dr. Atkinson then read the paper entitled

Pyorrhea Alveolaris.

"Flow of pus from the tooth-sockets" has long been recognized as a disease which it was impossible or difficult to successfully treat. Those who have dealt with it are divided as to the character of the departure from health, and as to the manner of treatment. Dr. Riggs regards it as a local disease, and amenable to local surgical cure; while many others, mostly homeopathists, attribute it to constitutional cachexy; and still others regard it as localization of a systemic debility. My own view is coincident with the latter.

The great merit of Dr. Riggs's practice is in his insistence upon the necessity for thoroughly removing *all* the altered tissue well down into the healthy structure, thus favoring reproduction by "first intention." His demerit is his persistent denial of any utility in constitutional or local medication.

All diversity of opinion respecting the diagnosis and treatment of this disease, and in fact of all diseases, lies in our tarrying in mere opinions, and acting as if they were well-established knowledge of nutrition and its aberrations. The various tissues of which the organs of the body are composed have characteristic degrees of form, density, toughness, pliability, and extensibility, by which we are able to distinguish and describe them. All the tissues are supported by the process known as nutrition. Hard tissues feed slowly; soft tissues are more rapid feeders. Hence nutrient changes differ in facility and rapidity in the various tissues in health, as well as in difficulty and slowness in the ratio of departure from the protoplasmic state, in which the most rapid nutrient changes occur.

The bottom facts of nutritional changes are so occult, in consequence of the smallness of the bodies in which they take place, that few have the patience and earnestness to study them for themselves; and therefore nearly all the recorded information on this subject is a repetition of the crude mass-observations of beginners in this field of research which have found their way into text-books and journals, so lacking in coherence of statement as to make it difficult for any pupil to master them so as to give to them a hearty assent by comprehending the changes described, or to reject them as non-understandable.

Nutritional changes consist of play of affinities so fine and evanescent as to defy formulation in such coarse terms as abound in the books recording the apprehensions of those who have made them a study. Hence the prevalence of adverse estimates pronounced in such cases on the one hand, and of enthusiastic assertions of easy and simple cure resulting in "all" cases with only "one application" of the "remedy" on the other hand. I have seen so many cases of the latter class, which had been pronounced cured with "one thorough treatment,"—in which, by the way, there were teeth which were not only loose in the sockets, but which had fistulæ which were discharging more or less of the broken-down tissue,—that I feel bound to raise a warning voice against unwise confidence in the short, sharp, and quick method of treatment. Not that there are no cases so cured, but that so many supposed to be cured have proved to be only palliated and set back, to break out again when they were lost sight of by the operator who had pronounced them cured, to fall into, sometimes, less competent hands.

Under these experiences we are led to suppose that different conditions have been grouped together as being the same form of disease, or that differing degrees of degeneracy have been deemed to be alike amenable to one single remedy applied in one way, and that "my way."

I am convinced that we will not see eye to eye until these cases shall have been made subject to clinical investigation and demonstration such as has had marked success in the other branches of our art, viz., filling teeth and fitting regulating and restorative fixtures, now so far advanced toward perfection.

One of the greatest obstacles in the way of understanding the various modes of nutritional change is the classification by which those which belong together are named as if apart and distinct. All nutritional metamorphosis occurs in protoplasmic bodies, which are the elements of every form of nutrifying body which converts pabulum into tissue. Where protoplasm is not formed into tissual limitations of neural, osseous, muscular, connective, or epithelial differentiations, the ameboid form of feeding holds the dominion of the field of nutrient activity, which in reality is the only condition in which these changes can take place. Therefore all foods must be reduced to the fluid state before appropriation is possible.

Atrophic dyspepsia of connective-tissue is the most difficult of detection, and is the first step in every case of pyorrhea alveolaris.

The bond of union between the tooth and its socket consists of a connective-tissue layer attaching it on its inner border with the cement corpuscles, and on its outer border with the myxomatous tissue of the gum, which in turn is covered with an epithelial coat consisting of several layers of epithelial bodies of globular, cuboidal, cylindrical, and squamous conformations. The cement-substance connecting these elements of the tissues is nitrogenized hyper-oxidized hydrate of carbon. In other words, the ameboid ectosarc is of such plasticity as readily to hold to or let go of its fellows composing protoplasm, mucus, blood, muscle, nerve, or epithelium.

To this fineness of interpretation, then, do we come at last to enable us to catch a glimpse of the territory in which the first divergence of health is displayed in every case of "pyorrhea alveolaris."

Wasting of the cement releases the hold of the connection, which by the resilience of gum-tissue opens a gap at the point of death of ectoblastic structure. In this chasm various deposits may occur. Where inflammation is induced, it may resolve or proceed to suppuration or sphacelus, caries or necrosis, according to the constitution and status of health of the body at the time. As a rule, the earlier and more manageable stages of this disease are not noticed by either the

patient or the practitioner, and hence well-pronounced cases are those which generally apply for relief.

When a ripened germ is separated from the bed in which it was generated, the act may well be named "parturition." If, then, protoplasm be the first form in which the feeding process can be proved to occur, are we not justified in the assertion that rejection of excess of food and incompatible material is the first example of increment and decrement, of coming together and going apart, or impregnation and parturition of elemental bodies?

All the functioning bodies of which we have any knowledge are composed of elemental bodies too small to be seen. When any department is denied its normal demand for nutrition, the harmony of function is lost, and career of body thus minified is cut short or destroyed. When enough destruction has been effected to be detected, the case is ready for investigation, diagnosis, prognosis, and treatment, or abandonment.

Concretions of lime are never causal of disease; only concomitant or sequential. No two specimens of calcareous deposit have yielded an identical analysis. They are the result of a breaking down of tissue-elements under stress of disease in which the acids requisite to holding the lime in solution are deficient in supply, or brought into contact with bases for which they hold higher affinity. The attempts to classify these deposits have resulted in a somewhat ambiguous nomenclature, viz., salivary calculus, serumal calculus, and sanguinary calculus.

The general term in common use to designate these deposits is "tartar," originating in a loose resemblance to the crust on wine-casks called by this term.

Whenever a deposit is formed it takes the shape of the pocket in which it is precipitated from the fluid holding it in suspension. Take the example of the pocket produced by the recession of gum about the neck of the tooth from solution of the dental ligament, and we find the deposit to conform to the shape and size of the pocket, from a mere nodule to the segment of a circle, or to an entire ring about the neck of the tooth. Take a case of the so-called serumal or sanguineous deposit at the end, or near the end, of the root, where the solution of the connective-tissue corpuscles forming the pericemental tract has broken down the cement-substance which fuses the corpuscles into a sheet or membrane, and we find the nodules to correspond to the chasm formed by the retrogressive nutrient act in form and extent of the separated tissue. All calcareous deposits in an inclosed chamber necessarily arise from the precipitation of the lime in the locality, and must be from the circulation direct, or the broken down molecules and corpuscles of the tissues

in the neighborhood. Deposits in open chambers may be from mucus, saliva, or free solutions of lime-salts, and may be properly named when we are able to determine their place of formation. The irregular composite calcareous bodies found in the respiratory, genito-urinal, and other circulatory tracts are easily understood so soon as their habitat is determined. The great masses of lime found in the lungs, the kidneys, the liver, the joints, and the mouth are all very interesting subjects of study, and are developed under the general laws of nutrition by organic, tissual, corpuscular, and molecular chemistry, and are amenable to classification when their origin is ascertained.

If a calculus contain cholesterine, we refer it to the liver for origin; if carbonate of lime predominates, we refer it to the respiratory tract; if phosphates and urates are present, to the urinal apparatus; if the carbonates and phosphates be mixed with epithelia and heterogenous foreign bodies, it is referred to the mucous and salivary tracts for origin. Wharton's duct, Steno's duct, and the necks of the teeth are the places where we may find concretions of this last character, as instance the large masses so often found about teeth which are not vigorously used.

If what has been said be comprehended, there remains only a very short statement to complete this paper upon pyorrhea alveolaris.

The three degrees or stages of this affection must be met by three degrees of extirpative energy: 1st, physiological; 2d, mechanical; 3d, chemical.

The first includes good feeding and hygienic cleanliness; the second, removal of foreign material by mechanical means; and the third, the destruction of ferments and their results by such means as kill the spores and their products and the debilitated tissue-elements, so that the physiological activities may throw off the offensive and effete matters and reproduce the tissues normal to the location.

To speak of the details of these methods of cure, and set forth their claims to attention, would involve the presentment of cases in the various stages and the special remedy to be resorted to in each. To give a mere hint of this labor, the best I can do is to give a former classification of application and remedy.

Where slight loss of the border of the gum is present, elixir of vitriol is the proper application to effect the purpose of inciting a return of physiological activity. Where greater loss of connection between tooth and socket is present, with some lime deposit, use a solution of aqua regia, one part to seven of water. In cases of greater loss of attachment and loss of considerable portions of the

alveolar plates, with or without foreign deposits, use caustic paste, made by melting together caustic potash ("potassa fusa") and crystallized carbolic acid, so as to make a homogenous paste, which upon cooling will be a solid and coherent mass, capable of being broken into bits of such size as to meet the demands of each case. Place these bits upon the site where you wish to form the eschar down to normal growth. The warmth will melt them and allow the affinities between this remedy and the altered tissue to convert all the dead and dying parts into a scab or eschar, which will form the limit of the pocket where sloughing occurs, into which the new protoplasmic exudate will form the clot out of which to secure the new growth. Wherever the parts press upon the locality so as to prevent or displace the exudate, a fixture must be resorted to to secure the clot in place long enough to enable it to be metamorphosed into the tissues normal to the part, from protoplasm (the clot) to embryonal corpuscles, myxomatous, connective, neural, vascular, and epithelial tissues, beneath which the new osseous growths will reproduce the sockets of the teeth.

Discussion.

Dr. Frank Abbott. I wish to congratulate Dr. Atkinson upon the excellent paper he has presented to us. While I differ with him upon some points in treatment, still I am sure he has given us most valuable thoughts for consideration. There are some parts of it, perhaps, that few of us understand clearly, and it may take us many years to get to the point of understanding them as he does. He commences his paper with Dr. Riggs's treatment of this disease, which is known among dentists to some extent as "Riggs's disease." To me this is a very unsatisfactory name, and I never use it. There are so many ways of treating the different phases of this disease that it would be necessary to present cases in order to come to any definite conclusion as to what we can and should do in any particular case. As for the surgical treatment, properly speaking, as practiced by Dr. Riggs, I believe it is too severe. I do not think there is any more necessity for cutting into the soft tissues, or attempting to cut away any portion of the alveolus, than there is for cutting into the gum outside or the tissues in any other location in the mouth. I have never yet seen a case in which the alveolus could be reached with an instrument without first cutting through the soft tissue. That Dr. Riggs does cure some cases of this disease by local treatment is probably true, for there are cases where local treatment is all-sufficient, and Dr. Riggs, or any other man, if he thoroughly cleanses the teeth from the deposits about them, will frequently get a return to health without any medication. But this will not hold

good in all cases. In the cases I have had under treatment I have found no necessity for using sulphuric acid, aqua regia, or caustic potash, for the reason that, although I have not cured, I have relieved every case that I have had to do with without such severe treatment. That an absolute cure can be effected with the above-named remedies, leaving no necessity for further treatment at any subsequent time, is in my opinion claiming altogether too much. *Pyorrhea alveolaris is never cured*,—*i. e.*, the normal conditions of the parts restored. That it can be relieved for the time being, and may appear to be cured, I know is true ; but the same condition that first developed the disease still remains in the patient's system, notwithstanding the treatment, particularly if it be altogether local. Now, the same primary conditions existing, the same results will recur unless the case is followed up and the treatment repeated every few months, certainly as often as once or twice a year.

I have heard it stated that cases of pyorrhea alveolaris occur without any deposit whatever upon the teeth, and also that this disease was entirely and emphatically due to some constitutional taint which produced the disturbance in the gum and interfered with its nutrition, causing the gum to detach itself from the necks of the teeth and leave an open pocket, without having, however, any deposit around the roots of the teeth, either calculary, serumal, or sanguinary. *There is some deposit on the teeth in every instance that I have ever seen.*

The doctor spoke of the pericementum or membrane attaching the root of the tooth to the parts adjoining. I heard this last summer quite a labored paper, taking forty-five minutes or more in the reading, and very vigorously read, too, in which it was attempted to establish what was claimed to be a fact that there were two membranes surrounding the root of a tooth. This, I believe, from actual observation under the most powerful microscopes, has never been proved. Possibly I may make a mistake, but I have never yet seen it, although I have examined this membrane many times under the microscope, and those who are best acquainted with that tissue, and who have studied it longest and most carefully, are of the same opinion. The paper I refer to was read at the meeting of the American Dental Association at Minneapolis, and, I think was not discussed at all.

From one statement made by Dr. Atkinson, as I understood it, I got the impression that he wished to imply that in pyorrhea alveolaris the alveolus surrounding the root of a tooth commences first to "waste away ;" that the gum, in consequence, loses its attachment to the neck of the tooth, leaving an open pocket. Possibly that may be the correct idea, but my impression has always been that

the gum first became inflamed to such an extent that its nutrition was interfered with; want of proper nourishment caused it to detach itself from the neck of the tooth, and thus a pocket was formed. This is what occurs in cases of salivation. The gums become diseased because nutrition is interfered with, and their attachment to the necks of the teeth is destroyed. I have heard the statement that no case of pyorrhea alveolaris ever occurred except where the patient had been salivated. Whether this is so or not I am not ready to state, but I believe that every person who has been salivated suffers more or less from this disease. I have been of the opinion, and am still, that under the irritation caused by deposits at the margin of the gum the pericementum throws out lime-salts which, mixing with epithelial scales and particles of food, are deposited upon the roots of the teeth, forming what we call tartar. In my treatment of all cases of this kind I have depended almost entirely upon a careful use of my instruments and the perfect removal of the deposits from the teeth, making them as smooth as I could, and simply washing out the pockets with a weak solution of carbolic acid. I believe that by this treatment I can accomplish all that can be accomplished in any way with a disease of this kind.

Dr. J. L. Williams. I don't think that I can add anything to the remarks that have been made; and it is pretty difficult to add anything to the aphoristic statements of Dr. Atkinson. If I were to say anything at all it would be in the line of a kindly criticism of the remarks of that gentleman, with an interrogation point at the close.

It seems to me that there is a great deal of difference of opinion and mystery hanging around the real nature of the trouble itself; and the treatment, of course, differs according to the conception of what the trouble is in its origin,—whether it is purely local, which it seems to me is a contradiction in terms, or whether it is a local expression of a constitutional disturbance. The view that is taken of the disease will determine the treatment. If it is a purely local trouble, surgical treatment is all-sufficient. But it can hardly be that, even if the immediately antecedent deposit of lime-salts around the teeth were sanguinary or salivary, because even that deposit indicates a perverted physiological condition somewhere in the body. If, as Dr. Atkinson says, the immediate antecedent of pyorrhea be atrophic dyspepsia of the connective-tissue elements, then it must be a local expression of a constitutional disturbance. If that is true, that it is a local expression of a constitutional disturbance, what right have we to expect local treatment alone, whether it be surgical or medical, or both combined, to prove more than palliative? Of course, the progress of the disease in most cases is slow. The

advanced cases have been a long time in coming to the condition in which they are found, and a purely local treatment, either surgical or medical, will for a long time palliate the difficulty; but if the disease is a local expression of a constitutional disturbance, then it seems to me that such treatment must be purely palliative, and that it is not scientific to say that a cure has been effected by it. If the treatment springs from some constitutional disturbance, is it not sure to return unless that constitutional disturbance be corrected?

Dr. Abbott. I did not make any statement in reference to what I believed the disease consisted of; but I do believe it is a local expression of a constitutional disturbance, just as the reader of the paper does. I have not any doubt that judicious constitutional treatment might do a great deal towards relieving these cases. What that constitutional treatment is or should be is a question that we have yet to determine positively. I would like to ask Dr. Atkinson what constitutional treatment he adopts in such cases, if any.

Dr. Atkinson. I almost invariably use constitutional treatment. It is only those cases that are very well endowed with good blood crasis that do not need constitutional treatment. Nutrition is the only means of cure. That goes without saying. That is physiological and pathological common sense. We know that everything that feeds must have something to feed upon, and if it feeds upon something in order to live, that which is called life must be transferred from the food to the feeder.

Dr. Abbott says he understood me to say that it was the alveolar process that was first involved in this disease. If he will read the paper when it comes to be published, if it shall be accorded that honor, he will see that I said atrophic dyspepsia of the connective-tissue was the first step. I mean—not the cementum, which we say constitutes the modification of the bone that makes the connection around the teeth—I mean the ectosarc, or outside skin of the ameboid body which we call the connective-tissue corpuscles, and which makes the lining of the socket and the tendons of the body. It has that peculiar waxy surface that enables those elements to be fused together, and that constitutes the tendons and the membranes. It is precisely the same as when you get a hang-nail; the first point that you tear away breaks the connection and leaves a hanging part. The reason why we don't understand these expressions of disease is that we have been looking at a mass of tissues in organs and not at the molecules which constitute them.

There is not a man in medical practice that is worth a snap to give advice in these cases. I saw that in one fresh from school at the Minneapolis meeting. Western men, although they follow the old text-books, are willing to learn and to ask assistance from

whatever source they can get it. They take us to be worth something, and they invite us to examine their cases, but we found them still pursuing the treatment laid down in the books, and following what was given up as effete years ago. They were poulticing periostitis of the jaws and alveolar abscesses.

I want to fasten upon your minds the growing necessity for the dentists of this city to establish a free hospital into which everyone who is suffering shall be able to go and receive intelligent treatment, where we shall demonstrate the very best ability of the profession, and join in having such clinics as we have never yet had; where we shall have such diagnosis, treatment, and cure as have never yet found pronouncement on this planet. When we shall have such an institution as I hope will be established in this city, so that we can have those things brought before the minds of all and get the best light on them, where we can pool our issues and let every man have the benefit of the best ability and work, then we will make a splendid advance. I wish I had time to make the demonstrations as clear to your minds as they are to my own. It is the nutrition of the five tissues that constitute the human body that we must understand, and know how the food we eat is converted into pabulum, how that pabulum is converted into blood, how the blood is transformed into protoplasm, and protoplasm into embryonal corpuscles, and embryonal corpuscles into the various tissues that constitute the organs of the beautiful machine that we call the human body, and which stands, according to the old Greek word *anthropos*, with upward-turned face.

The treatment for all patients that you will see, with the exception of about one per cent., will be to give a two-grain pill of the sulphate of cinchonidia night and morning. I have some patients who have pursued that treatment for four years. If they are at all nervous, then take McKesson & Robbins's nux vomica, phosphorus and cantharides, one pill each day, in addition to the four grains of cinchonidia. Some patients require a little more, some a little less, but it is not often that they require less than that. Why do we give cinchonidia? I have a suspicion that what we agree to call cruorin, which has a red color and means a red corpuscle of the blood that is carried through the system for its use, is so nearly like the sulphate of cinchonidia that there is no chemist who has been able to show the difference. Hence I take it that this cinchonidia is readily convertible into the cruorin which constitutes the red blood-corpuscles of the blood.

The treatment I have indicated is the general treatment. I can show cases of school-teachers who were all "played out" when they came to me, and who are now in full health and happy. I have

named the simple prescriptions that I have given for a long time. There are other prescriptions, such as elixir of vitriol,—half a teaspoonful in a wine-glass of water, to be given at meals to people who are all played out. There is another remedy to which a gentleman in this room, I think, owes his life, and that is aqua regia,—five drops in a glass of sweetened water, or ten drops to be taken after each meal for one or two weeks; then to be repeated after an interval as may be required. Then you get a gastric juice that does its work.

Dr. G. W. Weld. In cases of anemia does the doctor use chloride of iron?

Dr. Atkinson. Anemia is a deficiency of the blood. I have given you my idea of what cruorin is. That is the element that is most likely to be lacking. Don't fool yourselves any longer with that notion about iron. There is iron enough in every article of food you eat to supply all of that element that can be used in the body. Iron is not incorporated into the body outside of the blood, in which its special purpose is to make a magnet of the red corpuscle and to invite the oxygen to hang about it for transportation throughout the circulation, to effect the purpose of nutrition, which is combustion. Young muscle is light colored; old muscle is a deep color. Beef is dark in color, and veal light; and that is the key to the destruction of the blood-corpuscle in the nourishment of the muscle in which the cruorin is deposited that gives it its deeper color. Of all the multiplicity of remedies that we use ashes are the active principle. What are ashes? Ashes are the oxides of metals and metalloids.

Dr. Weld. I presented at the clinic this afternoon a case of lupus erythematosus of the lips, in which there is, as you know, a peculiar functional activity. It is what is sometimes termed scabbing of the lips. The skin peels off every twenty-four hours. There seems to be at times no help for this. Whether this malady be a local expression of a constitutional disturbance or not, I do not know. In this case the patient is forty years of age; he has no scrofula, and no specific taint; he never tasted a glass of liquor in his life, nor did he ever smoke a cigar. He is a powerful man. Evidently his blood contains a great deal of iron, and yet he has been under the care of one of the best New York physicians, who is unable to cure that little disease of the lips, which at least comes under the head of lupus erythematosus. It may not be exactly that, but it resembles it, inasmuch as there is a chronic hyperemia of the parts accompanied by an apparent new cell-growth. Now, what is the difference between this case of chronic disease and one of Riggs's disease? It is simply a want of functional harmony. In one case you have something resembling atrophy, and in the other hypertrophy, and

they may be both local expressions of constitutional disease. Regarding the treatment of Riggs's disease, I believe that every intelligent dentist and physician looks to the general health of his patient and prescribes for anemia if that treatment be indicated. Whether you use iron or any other one of the restorative agents for increasing the red blood-corpuscles, if you improve the general health by so doing, you must necessarily relieve the local disease. As far as the mechanical part of the treatment is concerned, I do not think it necessary to say anything. Every gentleman present knows, I think, how to use the instruments and use them skillfully.

Dr. Atkinson. I saw that case. The doctor says the patient is not of a strumous habit. He has the thick blubber lips that belong to the strumous habit. My impression is that a solution of salicylic acid in alcohol, properly diluted or of full strength, to paint the lips and cook the epithelium so as to make a scab and allow the parts underneath to heal, will work entire cure in that case. That it has any of the characteristics of lupus I did not discover. There was no eating about it. Lupus means a wolf, and all the cases of lupus that I have seen have had a ragged edge as though they were eaten away. They are not very malignant until they have been a long time in the system and have been given opportunity for deteriorating the pabulum that is to be transported to other parts of the system.

Adjourned. B. C. Nash, D.D.S., *Secretary.*

CONNECTICUT VALLEY DENTAL SOCIETY.

At the annual meeting of the Connecticut Valley Dental Society, held at Springfield, Mass., November 5 and 6, 1885, the following officers were elected for the ensuing year: E. A. Stebbins, president; J. N. Davenport, first vice-president; F. W. Williams, second vice-president; Geo. A. Maxfield, secretary; A. J. Nims, assistant secretary; W. H. Jones, treasurer; L. C. Taylor, J. P. Parker, and W. F. Andrews, executive committee.

Geo. A. Maxfield, D.D.S., *Secretary.*
Holyoke, Mass.

AMERICAN ACADEMY OF DENTAL SCIENCE.

The eighteenth annual meeting of the American Academy of Dental Science was held at Young's Hotel, Boston, on the afternoon of November 4, 1885.

The annual address was delivered by Dr. W. C. Barrett, of Buffalo, upon "The Diseases of the Period of Dentition." The officers elected for the ensuing year are as follows: J. H. Batchelder, president; C. P. Wilson, vice-president; E. E. Hopkins, recording secre-

tary; E. B. Hitchcock, corresponding secretary; E. H. Smith, treasurer; H. C. Meriam, librarian; Chas. Wilson, E. C. Briggs, and J. S. Mason, executive committee.

E. E. Hopkins, *Secretary*.

EDITORIAL.

THE DENTAL SECTION IN THE INTERNATIONAL CONGRESS.

A report of the proceedings of an informal conference of some twenty leading practitioners of dentistry, held at Buffalo on the 16th of November, reaches us as we go to press. We have only space to insert the following resolution, which was adopted without a dissenting voice. On the whole subject involved we shall have something further to say in our next issue.

Resolved, That we, as members of the dental profession, deem it inexpedient to recommend the organization of a Section of Dental and Oral Surgery in the International Medical Congress of 1887, under the present circumstances.

PHOSPHORIC ACID IN DENTAL CARIES.

We have received from Dr. E. S. Niles, of Boston, the promise of an illustrated paper for our January issue, in which he proposes to demonstrate that the presence of free phosphoric acid is the principal factor in dental caries. He designs to publish his experiments and tests in detail.

BIBLIOGRAPHICAL.

The Physicians' Visiting List (Lindsay and Blakiston) for 1886. Thirty-fifth year of its publication. Philadelphia: P. Blakiston, Son & Co.

This useful annual contains calender, list of poisons and antidotes, dose tables, ready methods in asphyxia, list of new remedies, diagram for diagnosing diseases of heart, lungs, etc. It is probably the most popular of all the visiting lists published.

Pamphlets Received.

Crown, Bar, and Bridge-Work: New Methods of Permanently Adjusting Artificial Teeth Without Plates. By Herbert Clifford, L.D.S., R.C.S.E. London: Simpkin, Marshall & Co., 1885.

Compulsory Attention to the Teeth of School Children. A Paper read by W. M. Fisher, L.D.S., R.C.S., Eng., at the Annual General Meetings of the British Dental Association, held at Cambridge, August 27 to 29, 1885.

Proceedings at the Annual Meeting of the National Civil-Service Reform League, held at Newport, R. I., August, 5, 1885, with the Address of the President, Hon. George Wm. Curtis. New York: Published for the National Civil-Service Reform League, 1885.

The Eye: Its Diseases and Therapeutics. By M. Salm, M.D., Austin, Texas. A Series of Practical Lectures. Lecture No. I: Diseases of the Lids. Reprint from the "Texas Courier Record of Medicine," Fort Worth.

OBITUARY.

WILLIAM BENJAMIN CARPENTER, LL.D., F.R.S.

Died, in London, November 10, 1885, Professor Carpenter, doubtless the most eminent and illustrious physiologist in the world. His death was caused by burns through the upsetting of a lamp while he was taking a vapor bath for rheumatism.

Dr. Carpenter was born in Edinburgh in 1813. He took all possible honors in medicine and surgery, and at the age of thirty-one was elected one of the English Immortals, a Fellow of the Royal Society. His works on human, general, and comparative physiology will render his name famous in all coming time.

DR. JOHN M. RIGGS.

Died, at Hartford, Conn., November 11, 1885, of typhoid pneumonia, Dr. John M. Riggs, in the seventy-sixth year of his age.

Dr. Riggs was born in Seymour, Conn., October 25, 1810; graduated at Trinity College, Conn., in 1837, and soon after commenced the study of dentistry, and has practiced in Hartford since 1840. He was a member of the Connecticut Valley Dental Association, and one of the vice-presidents of the Southern Dental Association.

On the 11th of December, 1844, Dr. Riggs extracted a tooth for Dr. Horace Wells while the latter was under the influence of nitrous-oxide gas,—the first application of anesthesia to surgery, antedating by nearly two years Dr. Morton's use of ether. Many years ago Dr. Riggs originated a method of treatment, mechanical in character, for the condition which has since come to be known as pyorrhea alveolaris, but which for a long time was called by his name,—"Riggs's disease."

Dr. Riggs was a man of strong character, and was highly respected and esteemed by his fellow citizens and by the dental profession generally. He was a bachelor.

PUBLISHER'S NOTICE.

THE DENTAL COSMOS FOR 1886.

For more than a quarter of a century the Dental Cosmos has held acknowledged leadership in dental journalism. The unvarying ambition of publisher and editor from the first has been to supply that which the dental practitioner and student as such most needed—knowledge in and for the practice of their profession. No effort has been spared to make it worthy of universal acceptation by dentists, and its constantly increasing subscription list is the certain indication that our efforts have been appreciated. We feel a legitimate pride in the very large circulation of the Dental Cosmos, and we purpose to maintain its supremacy by enlarging its sphere of usefulness wherever possible, so as to give it new claims to the patronage and confidence of every member of the dental profession.

To its thousands of readers, not a few of whom have been on the subscription lists from the first publication to the present time, it is unnecessary to say more than that once again the time for renewal of subscriptions has arrived. They know its value without being told: many of them have testified to us that they "could not keep house without it." We shall labor to make it more than ever a necessity to them.

To those who have not learned by systematic reading of its successive issues how properly to estimate its value we have to say that it has been, is, and will continue to be a strictly dental journal, conducted with constant, earnest, painstaking endeavor to promote the advancement of the science and art of dentistry.

The Twenty-eighth Volume will commence with the number for January, 1866. We ask for prompt renewals and subscriptions. A blank for the purpose will be found leading the advertising pages.

Subscriptions are required to commence with the January or July number. Price, $2.50 per annum, including postage to the United States and Canada. Subscribers in all other countries will remit the postage, the rate of which to Universal Postal Union countries is 50 cents; to Australia and New Zealand, 96 cents, per annum.

THE S. S. WHITE DENTAL MFG. CO.

HINTS AND QUERIES.

Prize Offer.—The Verein Deutscher Zahnkünstler (the Association of German Dentists) makes the following prize offer:

For the "invention of a process for preparing gold so that it may be manipulated for fillings after the manner of amalgam," we hereby offer a prize of *one thousand five hundred marks*. The amount of 1500 marks is deposited in the Sächischer Bank, in Dresden. We impose the following conditions:

1. The gold preparation must be such as can be manipulated like a silver amalgam, and readily introduced into the cavity.

2. The preparation must, in accordance with all the accepted rules of operative dentistry,—*a*, adhere perfectly to the walls of the cavity; *b*, assume at once and permanently retain the approximate or perfect gold color which is to be characteristic of it; *c*, be capable of taking a polish in the cavity; *d*, and, finally, form in the cavity a firm, compact block of gold, which will not suffer contraction in course of time.

3. The process must be new and capable of being patented.

4. The process becomes the property of the association.

5. With the description of the process, competitors must send in samples of the gold preparation, for which payment will be made at the standard gold value.

6. The name of the sender must not appear either on the description of the process or on the accompanying samples. Both must be marked with a motto, which must also be written on a sealed envelope containing the full name and address of the sender. Competition is unlimited.

7. Processes and samples must be sent in, at the latest, by April 1, 1886.

8. Processes and samples will be tested by the following judges: Herman Bothe, mechanical dentist, Dresden; Dr. E. Geissler, chemist, editor of the *Pharmazeut*, Central-halle, Dresden; Adolph Werner, dentist, Nice.

9. The decision of the judges will be given, at the latest, by January 1, 1887, from which day the prize will also be payable.

10. Unsuccessful work will be returned, but the association reserves the privilege of purchasing such work and of entering into negotiations with the senders.

Further information will be cheerfully furnished upon application to Aug. Polscher, editor of the *Monatsschrift des Vereins Deutscher Zahnkünstler*, Am Markt 3 and 4, Dresden, N., Germany.

Countersunk Tooth-Crowns.—Permit me to make a suggestion concerning the excellent new style countersunk tooth-crown. Practically, the only thing to guard against is a failure to make the base-plate fill the countersinks. Care should be taken to pack small pieces of rubber in each countersink until filled, to prevent the flat rubber sheet from so covering the countersinks as to make them valve-tight, and shut in air; thus preventing the rubber from entirely filling the cavities around the pins. The same result will follow pouring melted base metal into the flask, unless the hot flask is *lightly struck, or jolted*, to expel the air shut up in the countersinks. Using such care, the metal or vulcanite will hold these new teeth with a firmer grip than any of the old styles. The teeth themselves are stronger than any others, because the necks are wider from front to back.—W. O. H.

Re-implantation.—In August last I was compelled to extract a lower (2nd) left bicuspid for a gentleman who was anxious to have the tooth saved, but who lived so far distant that it was impossible to have it treated. I advised re-implantation. He finally consented, and I filled and replaced the tooth, after syringing the socket with tepid water and holding the tooth for a few moments in warm water and glycerin. Then, giving him a few capsicum plasters, and instructing him to use them in case of inflammation, I requested him to report in a few weeks. In the latter part of September I received a letter stating that the tooth was only slightly sore for a day or so, and that at the end of four days he could use it without any difficulty. He reminded me of a remark I had made that if the operation was successful he would not part with the tooth for $25, and said he wished it distinctly understood that the tooth was not on the market at any price.—G. A. Vawter, *Cambridge, Ill.*